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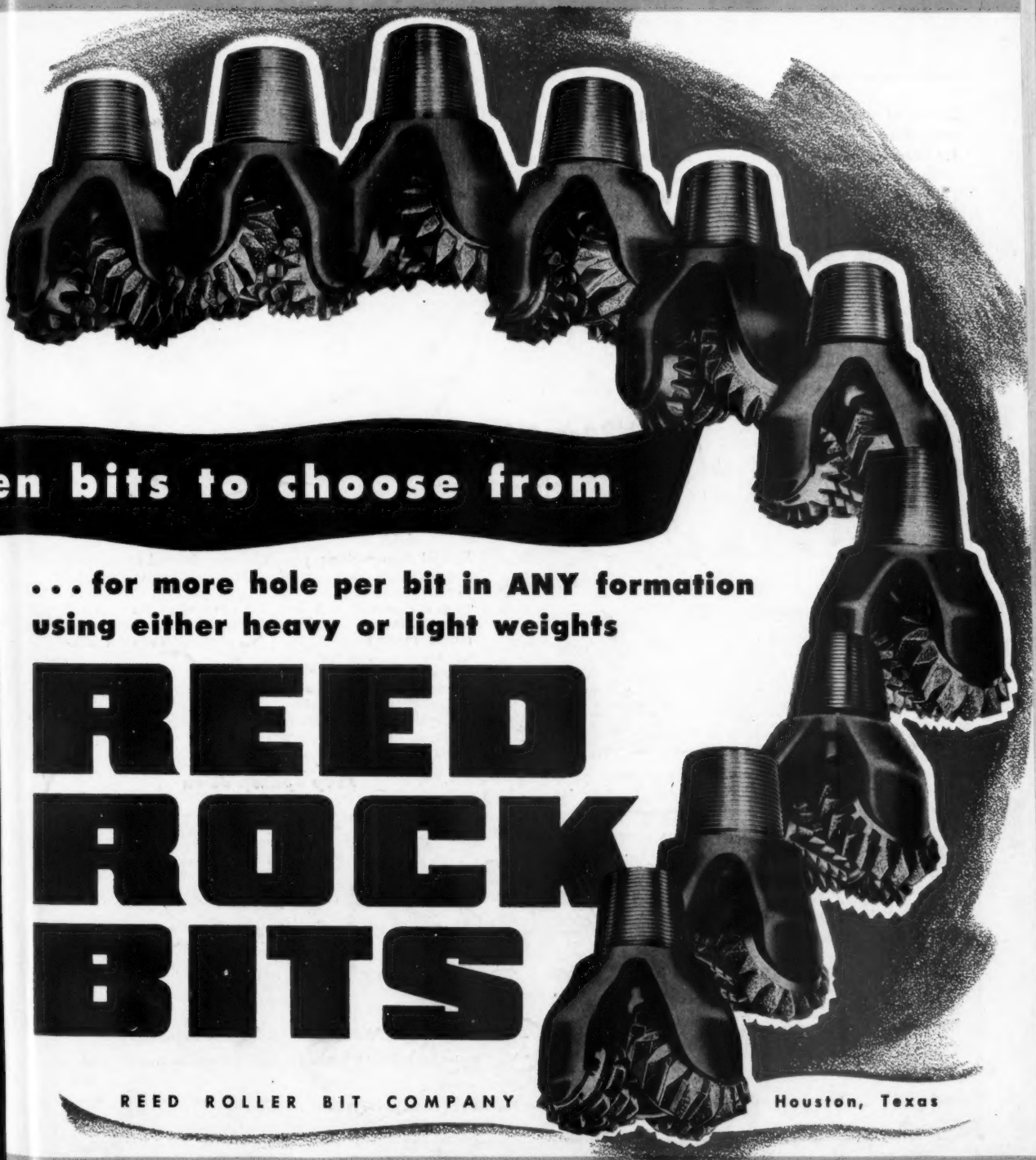

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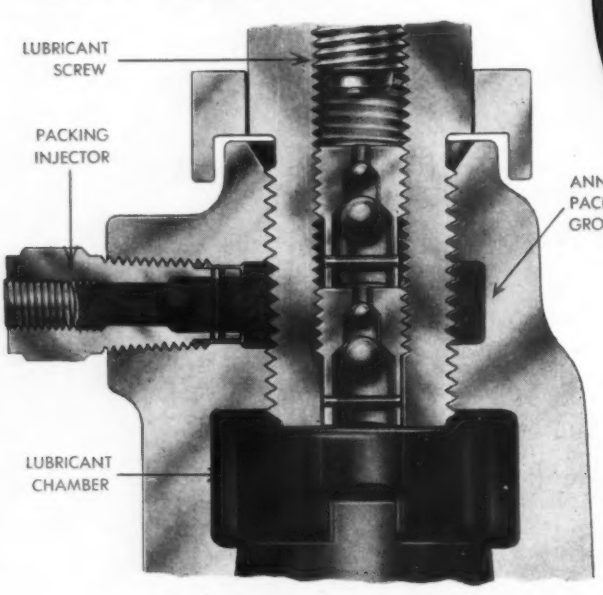
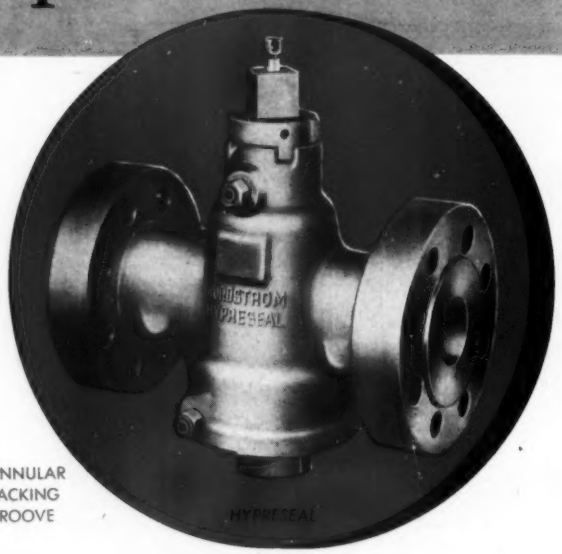


DETAIL OF UPPER SECTION OF HYPRESEAL VALVE



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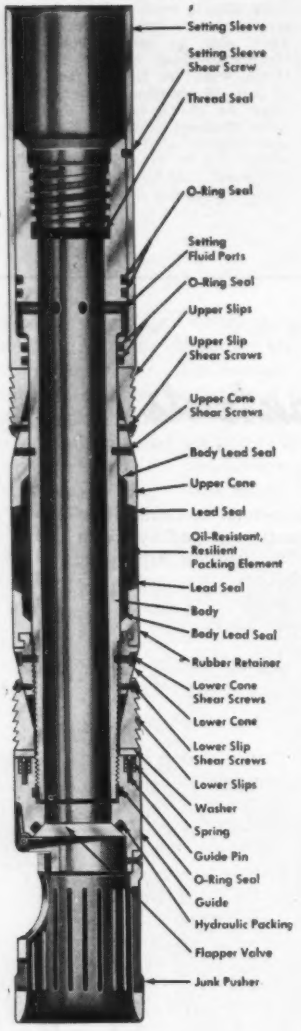

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THE OIL AND GAS JOURNAL

Synthetic Solution

AT the pitch of Washington's current oil-shortage hysteria, Secretary of the Interior Krug steps forward with a ready-made solution. He would have the Government "found an American synthetic-fuel industry". He wants to start at once, with authority to use $9,000,000,000 and 16,000,000 tons of steel to produce 2,000,000 bbl. of oil daily from coal and shale.

Krug's solution obviously springs from political opportunism rather than economic reality. It would impress voters that something is being done; it would enhance the prestige and appropriations of the Interior Department; it would put the Government further into business. It is a synthetic solution in the dictionary sense of "not genuine, artificial, factitious".

The facts, as men in Krug's own department could tell him, are that petroleum synthesis is not an industry but a laboratory experiment. The oil industry endorses government research on the subject, but there is no economic justification for "founding" such an industry at this time.

To produce 2,000,000 bbl. of synthetic oil per day would require that bituminous coal production and the number of miners be increased by at least 60 per cent. And the resulting oil would have only one-third the energy value of the coal put into the process.

Including facilities for mining coal and getting it to the synthesis plants, the requirements of money and steel would run about double Krug's estimates. This would make the capital outlay about equal to the entire value of all branches of the oil industry which produces and markets more than 5,000,000 bbl. of products daily.

The 16,000,000 tons of steel Krug wants would be sufficient to produce and refine 4,500,000 additional bbl. of petroleum daily, based on past experience in this country. There is every reason to believe the oil industry can fill all demands if given only one-fourth the steel Krug wants to use during the next 5 years, and at no expense to the taxpayers.

If the Secretary of the Interior sincerely wants more oil he could help by refraining from scaring the oil industry with threats of price and allocation controls, by making it easier to produce from the public lands he administers, and by dropping his claims to ownership of tidelands and the Continental Shelf. A tiny fraction of his $9,000,000,000 request spent in speeding his department's program of mapping and surveying, and research on secondary recovery and use of tar sands, would be of assistance.

If an "American synthetic-fuel industry" ever comes it will be through an evolutionary process when and as economically justified in relation to the then existing conditions in the coal and oil industries. It cannot be "founded" by Mr. Krug with any number of taxpayers' billions.

The opposite of synthesis is analysis. Analysis of the Krug proposal shows it to be not a synthetic-fuel program but a synthetic political program.

Plans for Huge Synthetic Plants Fantastic, Brown Tells Committee

by Bertram F. Linz

WASHINGTON.—The United States could import and store oil against a possible future military need with less expenditure of steel and waste of natural resources than by embarking on any ambitious program of synthetic liquid fuel production, a House armed services subcommittee was told last week by Bruce K. Brown, president of Pan American Petroleum Transport Corp. and chairman of the military petroleum advisory committee.

Emphasizing that he was discussing synthetics purely from the standpoint of national defense, Brown debunked the proposals of Interior Secretary J. A. Krug and Defense Secretary James V. Forrestal that the Government initiate a multibillion dollar construction program to supply 2,000,000 bbl. of synthetic oil daily, declaring that not even the argument of military security could justify the cost in money, men and steel.

Just what those costs would be is expected to develop through the work of a committee of oil, gas, shale and coal experts from industry and government, but its report, Brown said, will be classified "military confidential" and may never be made public.

Sticking pins in the Krug-Forrestal balloon, Brown told the subcommittee that large quantities of liquid fuels cannot be produced from coal without first revolutionizing the coal industry, since it would require 468,000,000 tons a year, or more than two-thirds our highest annual production, to provide 2,000,000 bbl. of oil daily.

Economics of Situation

Fuel can and will be produced from natural gas, but to secure as little as 500,000 bbl. daily would require the consumption of half the gas produced in 1946 and great amounts of steel.

"The production of liquid fuels by raising crude petroleum to the earth's surface, and refining it by conventional methods, is so much less costly in steel and manpower than the production of liquid fuel by any other method that that avenue of augmenting liquid fuel availability—whether for peace or war—must be given first preference," Brown said.

The subcommittee found significance in Brown's repeated assertion that synthetic fuel could not, and natural oil should not, be used for burning in furnaces or under boilers because of "convenience." It is, he said, the only fuel for planes, trucks, and automobiles and a more essential fuel for ships and trains. He predicted that "left to the law of supply and demand the several fuels will find their own economic level of use over a period of time."

Brown emphasized he is not "against" synthetic fuel production, but this production, he maintained, can be brought about painlessly and soundly by developing it over a period of years. "The costs of a forced wartime development as a major substitute for natural petroleum would be fantastic," he said. "A forced peacetime development using subsidy dollars is practically as difficult."

Practical Aspects

Getting into the practical aspects; Brown explained that it takes 26 tons of steel to produce a ton of oil from a new field and a new refinery in the United States and 11 tons in South America, but it would require 34 tons of steel per daily ton of oil from shale, 49 tons from natural gas and 70 tons from coal, not including the steel for the production of raw materials.

Further, he said, it takes about 85,000,000 cu. ft. of gas to produce 1,000 tons of liquid petroleum which, if used for ordinary heating purposes, would be the equivalent of 35,000,000 cu. ft. of gas, and it takes about 4.5 tons of coal to produce one ton of oil which has a B.t.u. content equal to only 1⅓ tons of coal; that is, gas or coal as such could be used more economically.

In addition, he went on, the production of 500,000 bbl. daily of oil from natural gas would require about 3,500,000 tons of steel, and production of a similar volume from coal would require about twice that much.

Production from shale offers greater economic justification, but the resulting oil is of low quality and difficult to refine into high-grade fuels, but, while he said he would not go into that phase of synthetics because of other witnesses who would discuss it, he expressed doubt as to the feasibility of rapid large-scale development of the shale deposits, because of manpower.

"From the standpoint of military security," he concluded, "an attempt to balance any computed gap between assumed wartime demands for military and civilian use by creating, out of taxpayer dollars, enough synthetic liquid fuel capacity to enable all of us who are fortunate enough to have oil burners to continue to use them looks to me to be unjustified when one counts the cost in steel, manpower and dollars and the waste of coal or gas that would be involved.

A Quicker Method

"I am convinced that we can get more oil—quicker—by making steel available to the oil industry than by any other method. Starting just a few large-scale synthetic plants at this time would—because of their enormous requirements for steel—cut down the immediate availability of oil by depriving the industry of steel it needs this year and next year."

Led into discussion of other phases of the supply situation by members of the subcommittee, Brown said one of the things that will contribute to military security is accelerated development of the tidelands—but by the industry under the control of the states, and not by the Government.

"I believe that this idea of the Government asserting sovereignty over tideland areas, particularly in the Gulf of Mexico, while it may be a fine principle to think about, is not going to produce oil."

"Development would be more rapid if the Government, having won its point of law, were to give it back," he commented.

Brown said also that the difficulties of developing the tidelands rendered them unsuitable for reservation by the Government, but he recommended that the Elk Hills reserve be maintained because the oil is readily accessible in case of need.

He also opposed Government subsidies for secondary recovery, but, while he said he doesn't like the word "allocation," "from the standpoint of national security we ought to have more steel for the oil industry."

Turner, Harper Incorporate

The oil partnership of Gov. Roy J. Turner and F. E. Harper obtained a charter for a $10,000,000 corporation to be known as the Harper-Turner Oil Co. The two other incorporators are Fred Stewart, general manager of the former partnership, and T. Murray Robinson, attorney.

Coal Gasification Rather Than Hydrogenation Urged by Keith

by Dahl M. Duff

CORPUS CHRISTI, Tex.—Coal gasification rather than expensive, inefficient coal hydrogenation as a means of meeting the existing shortage of available fuels was proposed here January 30 by P. C. Keith, president of Hydrocarbon Research, Inc.

Use of 100,000,000 tons of coal a year in a gasification process originally developed by the Germans would replace the 350,000,000 bbl. of petroleum fuels which the residual and distillate heating market is estimated to require annually by 1950.

This shift, coupled with the 650,000 bbl. daily of liquid fuels considered as available from natural-gas conversion, thus offers a way to bridge the 2,000,000-bbl. daily gap which has been mentioned by government authorities.

Keith is widely known for his work in the field of hydrocarbon synthesis and conversion. His remarks on the strategic utilization of fuels highlighted a 1-day Gulf Coast regional meeting of the Natural Gasoline Association of America.

A program for the wholesale conversion of coal to liquid fuels, either by high-presure hydrogenation or low-presure Hydrocol, is unwise at the present time, though it may ultimately be necessary. Keith said the proposals of some in Government for such a program, estimated to cost $9,000,000,000, were well meaning and sincere but he was not sure they were well advised.

Thermal Efficiency Low

Thermal efficiency of the coal-to-liquid fuel processes is fundamentally low—not better than 45 per cent—and there is a serious question if the tremendous quantities of coal required are readily available. Also, such a program would put the Government in the oil business with a huge investment since private capital would not undertake it.

Keith's alternative was essentially that the heating load now being carried by oil in the East and North be taken over by a low-B.t.u. gas made from coal. This would be an acceptable fuel and would allow petroleum to be directed into critical transportation uses.

One incidental result of the coal-gasification development is to indicate a ceiling on the price which can be paid for natural gas for transmission to the East and North. For example, Keith said, studies indicate gas to serve Chicago from a nearby gasification plant could not compete with Hugoton natural gas but that it would be cheaper than paying 11 cents for natural gas in Nueces County, Texas, considering the added transportation cost. A comparison of this kind, he said, naturally is based on a number of assumptions, such as $2 a ton coal mining costs and a gasification efficiency of 75 per cent.

The gas-from-coal process is noncatalytic and relatively simple. It proved feasible in the Prague and Leipsig areas. The Texas Co., the Shell organization, the Jersey Standard organization, Pittsburgh Consolidation Coal Co., and Hydrocol are now spending substantial sums on research, and a 10-ton pilot plant is operating at Trenton, N. J.

Keith reviewed the nation's sources of energy over the past few decades and pointed out the decreasing percentage of the energy load carried by coal—a trend emphasized in an earlier talk at Houston by H. C. Wiess, president of Humble Oil & Refining Co. Keith asserted coal can be mined on a B.t.u. basis cheaper than taking oil out of the ground but that the transportation and distribution costs are far out of proportion. This cost consideration, plus the cleanliness and convenience of oil, has promoted the shift to petroleum and natural gas.

Keith said the natural-gas conversion process is "over the hump" and is here now. Its wide-scale use would provide 235,000,000 bbl. a year without jeopardizing gas reserves and still leave the 5 trillion cubic feet a year which it is estimated the natural-gas pipe lines will require in 1950. "Refining" costs with natural gas are slightly higher than with petroleum, but production costs are less, and the two factors balance out.

Progress on Brownsville Plant

Answering a question from the floor as to the progress of the natural-gas conversion plant of Carthage Hydrocol at Brownsville, Tex., Keith said some difficulties had been encountered but indicated they had been overcome. The engineering, he said, is essentially finished, and 80 per cent of the materials ordered. Foundation work is in progress, and completion is planned in May 1949. The plant of Stanolind Oil & Gas Co. in Hugoton field is almost but not quite as far along.

Seven companies share in the ownership of Carthage Hydrocol with The Texas Co. holding the largest interest. Keith, in comments after his talk, said the product more properly should be called a blending agent than a motor fuel. It is an 80-82-octane material with a 12-point "jump." Production of 7,500 bbl. daily is planned at Brownsville.

Elaborating on comparative plant costs at Hugoton and Brownsville,

(Continued on page 129)

Among those at the N.G.A.A. regional meeting January 30 in Corpus Christi was this group: L. P. Wood, assistant to the L.P.G. procurement manager, Phillips Petroleum Co., Bartlesville; James Doughty, vice president in charge of production, Southern Minerals Corp., Corpus Christi, and chairman of the program committee for the meeting; B. R. Carney, assistant to the president, Shamrock Oil & Gas Corp., Amarillo; W. A. Van Hook, Jr., plant superintendent, Stanolind Oil & Gas Co., Bishop, Tex.; and standing, C. R. Williams, vice president, The Chicago Corp., Corpus Christi, and president of the N.G.A.A.

Forrestal Suggests Government Interest in Arabian American

WASHINGTON. — Acquisition by the federal Government of either an option on 10 per cent or other fixed proportion of the Saudi Arabian reserves of Arabian American Oil Co. or a direct stock interest in the company was suggested to the Senate war investigating committee last week by Defense Secretary James Forrestal.

Forrestal agreed with Sen. Owen Brewster of Maine, who presided, that with an interest in the oil the Government might be committed to a more energetic protection of American interests in the Middle East, in the event of need, than it displayed when Mexico moved to expropriate foreign oil properties 10 years ago.

He also agreed with Brewster that a third alternative by which the Navy might be assured of a continuous future flow of Middle East oil might be an arrangement under which the Government could take such oil as it required from time to time at a prearranged price.

Forrestal staunchly defended the contract under which the Navy is buying Middle East oil from Aramco and told Brewster it was not fair to attempt to apply the calm reasoning of peacetime to arrangements made under the stress and haste of war.

"This was the cheapest oil we had ever bought," the secretary said, explaining that cost was not the price paid at point of origin but that price plus transportation to where the oil was needed. Oil from Aruba at a price of 95 cents a barrel would have cost $248,000 to ship to Pacific destination against $117,000 for $1.05 oil from the Persian Gulf.

Brewster Questions Feis

The secretary admitted, however, that if, as charged by Brewster, the justification for the 1945 contract filed in the Navy records was inaccurate in stating that the price was based on a 42 cent royalty when Aramco actually was paying only 21 cents and the royalty had been misrepresented by the company, it was a serious matter.

Before Forrestal arrived to testify, Brewster questioned Dr. Herbert Feis, from 1931 to 1943 adviser to the State Department on international economic affairs, regarding the employment of Max Thornburg who, Feis said, "for convenience and by negotiations," had the title of special assistant to the undersecretary.

Feis explained that as his staff expanded in the early days of the war it was felt a man should be added who had detailed knowledge of Middle East oil. Thornburg was recommended and appointed, but within 3 months "broke away" from the staff and operated "as at least a semi-independent branch of the department."

Feis said he had understood Thornburg was no longer in the employ of any oil interest and was "stopped cold" when he learned that he and another member of an interdepartmental committee which the economic adviser headed were receiving large sums from former employers. He was informed, he said, by a Navy man and immediately investigated, the result being that the committee was disbanded and Thornburg's connection with the department was terminated.

Industry Cooperation Eases L. P. G. Shortage

HOUSTON.—Emergency measures were being taken last week by Texas refineries and gas-processing plants to increase butane-propane supply in view of the tight supply of these fuels in parts of the state.

In Corpus Christi, cooperative action by three companies, Celanese Corp. of America, The Chicago Corp., and La Gloria Corp. made available about 200,000 gal. All La Gloria's and Chicago's butane and propane production is sold on firm contract to Celanese for use in its Bishop, Tex., chemical plant. Celanese released the 200,000 gal. after William J. Murray, Jr., member of the Texas Railroad Commission, asked all assistance possible in making supplies available for domestic use.

Chicago took over the job of supplying Celanese through a new 9-mile, 4-in. pipe line, thus allowing La Gloria's production to be diverted to L.P.G. use. La Gloria was shipping the material on instructions from a representative of Gov. Beauford Jester.

Murray subsequently sent a message of appreciation to the three companies that their action "exemplified the special cooperation the government and legislative bodies in charge of the oil and gas industries receive in times of emergency from the producers and processors of petroleum."

Humble Oil & Refining Co. in Houston announced that it was rearranging operations at its Baytown refinery to make available about 1,000,000 gal. of butane and propane. Humble said the temporarily added supply would go to regular dealers on a proportionate basis.

In Austin, Governor Jester set up a commission to handle the distribution of about 3,000,000 gal. of butane and propane made available in the emergency. The governor pointed out the supplies in many cases resulted from a sacrifice of fuel oil and gasoline production or of industrial use. The commission members are Murray, John H. Winters, state director of public health; Homer Garrison, directo of public safety, and Dr. George W. Cox, state health officer.

World Oil Resources Adequate, Collier Says

LOS ANGELES.—As production is stepped up in the Middle East, oil from that part of the world will supply Europe and Asia, and South American oil now flowing to Europe will be diverted to this country to supplement this nation's reserves, H. D. Collier, Standard Oil Co. of California board chairman, declared recently before luncheon meeting of Los Angeles publishers, bankers, and other business leaders.

"World supplies of oil are ample to meet future world needs," Collier said. "All of the machinery is in motion which will bring supply and demand into balance on a world-wide basis."

In undertaking exploration in Venezuela and Colombia, Collier said, his company is planning for the day when the Pacific Coast will need imports by water.

"Such imports are not needed yet," he added, "but we wish to meet that need when it arises."

"Oil supplies, whether in California or in the United States, are part of a world picture and cannot be considered solely from a regional viewpoint. Petroleum is fluid and can readily be transported over water or land at relatively small cost. The fundamental question then is: 'Does the world have enough oil?' My answer to this is emphatically 'yes.' The world has underground reserves which unquestionably are adequate to take care of its needs far into the future."

O.W.I.U. To Ask Third Increase

The specific amount of increase that the Oil Workers International Union, C.I.O., will request in its campaign for a third round of postwar wage boosts, will be announced February 9, according to O.A. Knight, president of the O.W.I.U.

this week

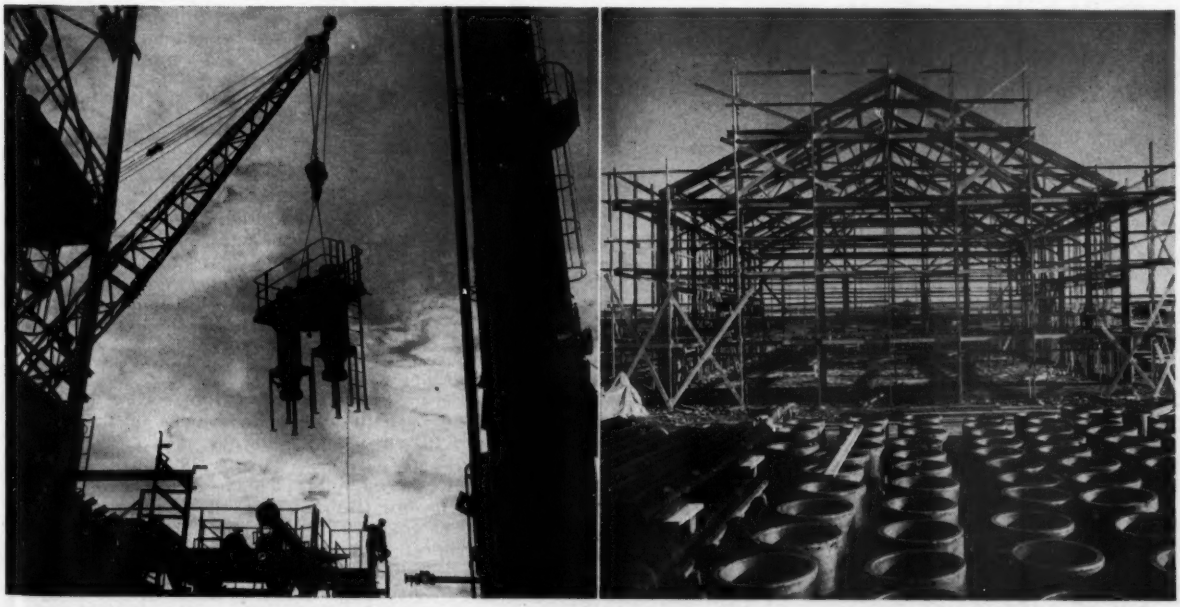
TRENDS—Crude-oil production during week ended January 31 averages 5,343,200 bbl. daily, a drop of 7,305 bbl. from the previous week. . . . Drop ended a 3-week period of consecutive all-time records. . . Week was the sixth consecutive with an output over 5,300,000 bbl. . . . ¶Completions during week ended January 31 total 674, against 673 in the previous week and 500 a year ago. . . . ¶Wildcats total 113, against 107 in previous week. . . . ¶Runs to stills during week ended January 24 average 5,446,000 bbl. daily, a gain of 102,000 bbl. daily from the previous week but still below the all-time record of the week ended January 3 of 5,637,000 bbl. . . .

INDUSTRY—NPC voluntary allocation program given go-ahead by Attorney General Clark. . . . ¶Recent performance of refineries indicates virtually all points of program already being carried out. . . . Refinery runs first 3 weeks in January 13 per cent above same period in 1947. . . . ¶Texas refiners and gas processors take emergency measures at request of state officials to increase butane-propane supply. . . . ¶Industry leaders appearing before Washington committees attack government proposals for price controls, embargoes on exports. . . .

PIPE LINE—Contract for 90 miles of 20-in. line from Jal, N. M., to Midland, Tex., awarded to Morrison Brothers Construction Co., Inc. . . . This covers a section of the Jal-Cushing, Okla., project. . . . ¶Stanolind Pipe Line Co. lets contract for 16-in. river crossings. . . . ¶"Techint" contracts for southern section of 1,100-mile, 10-in. Comodoro Rivadavia-Buenos Aires, Argentina, natural-gas line.

INTERNATIONAL—Venezuelan Government royalty oil in 1948 to bring about $186,750,000. . . . New contracts yielding more revenue signed last month. . . . ¶Creole sets new Venezuela crude-oil production record in December of 616,838 bbl. daily. . . . ¶Defense Secretary Forrestal suggests federal government option on portion of Saudi Arabian reserves. . . . ¶"World supplies of oil are ample to meet future world needs," H. D. Collier, Standard Oil Co. of California board chairman tells business leaders. . .

SYNTHETICS—Bruce K. Brown tells congressional committee huge government program for synthetic liquid fuels production is fantastic. . . . To import and store oil against future military necessity would be cheaper, Brown says. . . . Huge synthetic fuels output would necessitate revolutionizing of coal industry. . . . ¶P. C. Keith, president of Hydrocarbon Research, Inc., tells N.G.A.A. coal gasification should be undertaken rather than hydrogenation to bridge the 2,000,000-bbl. daily gap between future production and demand forecast by government officials. . . . ¶Senate public lands subcommittee reports favorably on bill to extend for 3 years Bureau of Mines synthetic-fuels investigation. . . .



Typical of the oil industry's efforts to increase its capacity for meeting products demand are these photographs illustrating Imperial Oil, Ltd.'s, movement of the Whitehorse, Yukon, refinery to Edmonton, Alta. Left: Workmen dismantling the plant in the Yukon. Right: First construction under way at Edmonton. The refinery, purchased as surplus for $1,000,000, is costing an estimated $7,000,000 to move but is expected to be in operation in 18 months less time than it would take to build a new refinery. The world's largest trucks, valued at $35,000 each, are being used to transport the refinery's facilities nearly 1,000 miles down the Alaskan highway to Dawson Creek, from where they are being carried to Edmonton by rail

Industry Allocation Program Given Green Light by Attorney General

WASHINGTON.—The petroleum industry last week was given the green light to go ahead with the voluntary allocation program outlined by the National Petroleum Council at its January 22 meeting. *(The Oil and Gas Journal, January 29, page 142.)*

Attorney General Tom C. Clark gave assurance that any action "within the scope of the recommendations contained in the report . . . will not be regarded as the basis for any proceedings under the federal antitrust laws."

Clark's clearance will run until April 1 or the formal adoption of an industry plan, whichever is earlier, and the Interior Department is preparing for a public hearing at which industry, labor and the public will be given an opportunity to submit their views.

Formal aspects of the matter were dealt with in an interchange of letters between Interior Secretary J. A. Krug and the attorney general, both dated January 28.

Krug pointed out that most of the 20 recommendations in the NPC plan can be adopted by individual companies without the necessity of industry-wide agreements and said he had urged the industry to carry out immediately all recommendations which can be put into effect in that way.

In his reply, Clark noted that none of the recommendations calls for the fixing of prices, which is specifically prohibited in the law, and commented that since individual companies can adopt most of the recommendations without concerted action, "it would appear that the major portion of the action now recommended . . . would present no antitrust problem."

However, he added, in view of the acute fuel situation and the fact that some time will be required to formulate an industry plan, concerted action in the interim will not subject the industry to the possibility of antitrust proceedings.

Following the public hearing required under the law, Krug said, a "practicable and appropriate" industry program will be formulated and submitted to Clark for approval.

Immediately NPC Chairman Walter S. Hallanan set up a committee head by W. Alton Jones, Cities Service Co., New York, to confer with Justice and Interior officials.

Members of the committee will be Reid Brazell, Leonard Refineries, Inc., Alma, Mich.; Jacob Blaustein, American Trading & Production Corp., Baltimore; Russell B. Brown, Independent Petroleum Association of America, Washington; Fayette B. Dow, National Petroleum Association, Washington; J. Parks Gwaltney, National Council of Independent Petroleum Associations, Durham, N. C., and B. L. Majewski, Deep Rock Oil Corp., Chicago.

In a formal statement, Hallanan expressed the pride of the industry to develop a voluntary agreement, and commended Krug and Clark for the promptness with which they acted to give Government approval.

NPC Program Already Virtually Met

THE program to increase the production of heating oils, just approved by the Attorney General, has largely been anticipated by the nation's refineries, as statistics on their performance in recent weeks show that they were already doing virtually everything called for in the program before it was formulated by the National Petroleum Council under authority of the Taft Act.

This program, which now permits the oil industry to collaborate to the extent required, calls on refineries to run crude at the top levels of their capacities for the next 60 days and at the same time to turn as much of the crude into distillate fuel oil as is physically possible.

During the first 3 weeks of January, that is, before the NPC program was announced, refineries of the United States processed an average of 5,359,700 bbl. of crude daily. This is 621,000 bbl., or 13 per cent, above the level of January 1947, when crude runs averaged 4,738,600 bbl. daily.

How much this can be bettered during the coming weeks is problematical. The rated capacity of all the refineries in the country is approximately 5,680,000 bbl. daily, but this has never been attained in practice. The record was the week of January 3 when, for a single week, runs averaged 5,637,000 bbl. of crude per day. While some refineries can run at more than 100 per cent of their designed capacity for extended periods, others can never reach their theoretical top. And every plant must shut down now and then for maintenance or other reason.

In production of distillate fuels—the immediate objective of the NPC program—current performance is also so good as to leave little chance for spectacular improvement. During the first 3 weeks of January production of distillates averaged 1,080,200 bbl. daily. This is an increase of 38.8 per cent over the output of distillates during January 1947, which was at the level of 778,000 bbl. daily.

This huge gain is due both to the larger volume of crude run and to a higher yield of this product. Refiners have adjusted their operations so that currently they are turning 20.2 per cent of the crude into distillate fuels A year ago the distillate yield was only 16.4 per cent. It is doubtful that most refineries will be able to make further adjustments to obtain greatly increased distillate yields, though some can do it by marketing as fuel stocks of semifinished products which normally would be cracked into gasoline.

At Expense of Gasoline

The NPC program contemplates that distillate yields will be increased at the expense of gasoline output. It is too early to determine the extent to which gasoline is being sacrificed for high yields of heating oils because there are a number of alternate processes which may be used in making finished motor fuel from the various raw stocks which may be available. The figures do show that production of finished gasoline is higher than a year ago, stocks are increasing, and total stocks are slightly above the level of January 1947.

The high fuel-oil yield is not at the expense of kerosine, the yield of which is 6.4 per cent of crude run—exactly the same as a year ago. The yield of residual (heavy, or industrial) fuel oil was 23.8 per cent during the first 3 weeks of January, compared with the rate of 24.7 per cent a year ago, but because of higher crude runs production is averaging 1,278,000 bbl. daily compared with 1,176,000 bbl. daily in January 1947.

In spite of this record output of distillate fuel, stocks of the product dropped an average of 363,000 bbl. per day during the first 3 weeks of January. This is an improvement over the rate of stock disappearance—499,000 bbl. per day—which caused such alarm last December. (The Oil and Gas Journal, January 1, 1948, page 20.) It is quite in line with the rate of decline of 369,000 bbl. daily of January 1947. However, total stocks of distillate fuels in the United States on January 24, 1948, were only 42,404,000 bbl., whereas on January 25, 1947, they were reported 50,670,000 bbl.

Price Controls, Exports Embargo Draw Industry Fire in Hearings

WASHINGTON.—Imposition of price controls on petroleum would seriously retard the intensifying effort to replenish the nation's oil resources, the Senate banking and currency committee was warned last week by Russell B. Brown, general counsel of the Independent Petroleum Association of America.

Brown's attack on Interior Secretary J. A. Krug's plea for price and rationing authority came as committees on the House side of the Capitol delved into the fuel-oil shortage.

Before the House interstate and foreign commerce committee, meanwhile, Undersecretary of Commerce William C. Foster vigorously opposed proposals to place an embargo on all oil exports and disclosed the department is considering the extension of export control to crude petroleum and lubricating oils.

The House armed services oil subcommittee heard OGD Director Max W. Ball outline, again, the underlying causes of the present situation and the none-too-hopeful prospects for the next 2 or 3 years.

A fourth committee currently considering oil received a report that the voluntary conservation program is making progress. Conferring with the oil group of the Senate interstate and foreign commerce committee headed by Sen. Charles W. Tobey of New Hampshire, who also is chairman of the banking and currency committee, J. C. Richdale, vice president of Colonial Beacon Oil Co. and chairman of the industry advisory committee set up by Tobey last year, declared that approximately 20 of the 50 tankers now being readied for service by the Navy should be placed in the North Atlantic service.

Richdale Opposes Exports Embargo

Richdale reported that analysis of refinery data provided by Tobey indicated that efforts to maximize the yield of fuel oil are showing results.

Richdale joined Foster in opposing an embargo on exports, declaring it would be "very silly" and pointing out that exports are inisignificant in quantity and for the most part not of the same types as the products which are scarce here.

Foster told the House committee that to embargo all exports might lead to reduction of supplies to us from abroad. Further, he said, the United States has a "moral responsibility" to see that some supplies go to countries which for years have depended upon us, and "to stop could mean complete collapse in those countries."

Foster disclosed that the current quota of 12,000,000 bbl. is little more than half of the 23,421,000 bbl. of products which foreign countries said they would require. Members of the committee, however, charged that the quota figures do not give a complete picture of oil exports.

No Available Navy Tankers

Following Foster, new Assistant Secretary of the Navy Mark Edwin Andrews reported that four naval shore stations are being converted from oil to coal and promised to explore the possibilities of converting others. But, he said, the Navy has no tankers which it can use for the transportation of civilian supplies, nor has it any great volume of suitable oil which it can lend to the states as it loaned 940,000 bbl. to the New England governors last month.

The delivery of 50 Maritime Commission tankers will release a corresponding number of vessels for charter or sale by the maritime committee, Andrews said, but the 86 tankers which the Navy then will have will be only sufficient to provide transportation service for all of the military agencies.

Refuting insinuations by administration officials that the industry would never be able to overcome the present situation without Government intervention, imports, development of synthetics, and other similar steps, Brown told the Senate banking committee that new discoveries last year were more than a third greater than in 1946 and that preliminary estimates indicate that more than 3,000,000,000 bbl. were added to our reserves.

"The progress indicated by the 1947 activities came about after the removal of price controls and other forms of government restriction," he pointed out.

Brown scoffed at Krug's statement that, given authority, he would "freeze" oil prices for a period of 60 days while he ascertained what the proper prices should be and said price studies made during the war took nearly a year or more, while price control and limitations on materials and manpower forced the producing branch close to the point of bankruptcy.

"When Secretary Krug appeared before your committee and condemned the increase in petroleum prices as inflationary," he said, "he failed to take into consideration the fact that these prices were frozen for more than 4 years at a depressed level, and took no notice of the fact that petroleum prices are still below the general price level after the several adjustments that have taken place in the past 18 months."

Brown emphasized that there is a conflict between Interior officials on the question of price control, Undersecretary Oscar L. Chapman having told the A.P.I. convention in November that Government controls would only aggravate the situation without contributing to its solution.

"I feel certain that the rather naive approach to a delicate problem that the Secretary of the Interior has suggested would readily bring disastrous delays to the program of development which is now being carried on with all the vigor possible, limited only by inability to get supplies and equipment," he said.

Information on current operations in the Middle East was given the Wolverton committee by James Terry Duce, vice president of Arabian American Oil Co., who reported that Saudi Arabia production has reached 315,000 bbl. daily and is about at the capacity of present facilities.

Aramco now has 88,000 bbl. daily for shipment offshore, but such operations are limited by loading facilities and stabilizer capacity to remove the hydrogen sufide which occurs in the oil. Additional facilities are to be constructed and it is planned to increase shipments of crude and products to 500,000 bbl. daily by July, 1949.

Working Toward Schedule

Despite an outbreak of cholera in Syria and the riots and civil disturbances incident to the UN decision to partition Palestine, Aramco is working to complete its pipe line on schedule, Duce testified.

The Aramco line is only one of several building or planned in the Middle East, Duce said, one of them, from Abadan to Kuwait, to be even larger—a 34-36-in. line with a 500,000-bbl. daily capacity. A 16-in. line from Kirkuk to Haifa will be completed this year by the Iraq Petroleum Co., which is also considering a line, probably 30-31 in., from Kirkuk to the Levant coast, and a Gulf-Shell line may run from Kuwait to the Levant coast.

When all these lines are completed, at least 1,500,000 bbl. of oil will be delivered daily on the shores of Lebanon, Palestine and Syria, he said.

Duce criticized the opposition to the export of steel because of short supply when nothing was being done to halt the use of metal for ornamental steel fences, for cans where bottles would do and other nonessential purposes.

International

WORLD-WIDE OIL DEVELOPMENTS

Huge Gain Seen in Venezuelan Income From Royalty Oil in 1948

THE Venezuelan Government will realize $13,500,000 more in crude-oil royalty revenue this year, bringing the total government oil royalty in 1948 to approximately $186,750,000.

The royalty contracts yielding more revenue to the Venezuelan Government were signed last month in Caracas at the Ministry of Development. Commenting on this, Dr. Juan Pablo Perez Alfonzo, minister of development, said that his government had proved through its recent auction of royalty oil that higher prices are obtainable at this time.

"This arrangement will be more profitable to Venezuela than agreements with individuals," the official announcement released in New York said. Presumably this reference is to interests other than the oil-producing companies in Venezuela which have offered premiums for Venezuela's royalty crude oil. "The government will retain, however," it was explained, "its option of trading some of the royalty petroleum for merchandise if it is compelled to do so due to a scarcity of merchandise in Venezuela."

For instance, Argentina will receive Venezuelan royalty oil in exchange for meat under a 2-year contract.

Price Retroactive

A breakdown of the terms of the new agreements with the producing companies shows that they will pay an average of $1.08 above the normal price per cubic meter (about 19 cents per barrel) on the amount already sold in October. The new price for royalty oil begins with November 1947 production.

Bachaquero Zulia is the lowest quality crude oil cited and will be sold for $1.86 a barrel, while the highest in El Roble at $2.71 per barrel. In all, 20 different prices are quoted.

All prices may go up according to the market but they may not drop below prices guaranteed in the agreement.

Joint Russo-Iranian Company Dead Issue

WHILE the Iranian Government appears determined to increase indigenous crude-oil production within her borders, it is not all clear as to the method which will be employed. However, it is a practical certainty that the projected Russo-Iranian Oil Co. is a dead issue and that any oil Russia may get will be on a straight sale basis and not from a concession granted by Iran.

The latest report from Teheran states that a spokesman of Iran's Seven-Year Plan Council has explained that, under the plan, Iran herself will develop all oil fields except the area under concession by the Anglo-Iranian Oil Co., Ltd. Anglo-Iranian's concession, it was explained, forms only a fraction of the country's potential crude oil reserves.

From the announcement that geologists and geophysicists from Holland, Switzerland and the Scandinavian countries would be employed to conduct the proposed exploratory program, it would seem that the Iranian Government will not purposely "affront" the delicate feelings of Soviet officials.

Situation Puzzling

Whether the Levantour Co. of Tehran, which was previously reported as having been capitalized at $32,000,000, is a private or jointly-owned government concern, the entire situation regarding these oil operations in Iran remains a puzzle. The most authoritative reports indicate that little, or nothing, will materialize from current plans.

According to one dispatch from Iran, that country would — assuming that the announced exploratory program went through and was successful—sell any "surplus" crude oil to Russia.

Creole Output Sets New All-Time Record

WITH an all-time high of 616,838 bbl. daily, Creole Petroleum Corp. set a new record for its Venezuelan crude-oil production in December. Prior to this the highest daily average for any month was reached last October with 604,127 bbl. daily. Daily production in November was 603,814 bbl. daily.

December's increased production came largely from the Lake Maracaibo area, which accounted for 452,393 bbl. daily of the 616,838 total. In November, the Lake Maracaibo area provided 440,579 bbl. of the 603,814 total. Other areas from which Creole drew the December production were: Mara district and Cumarebo, 9,818 bbl. daily; and eastern Venezuela, 154,627 bbl. daily.

Wells completed on the west shore of Lake Maracaibo and which penetrated the Cretaceous indicate that this area has even greater possibilities for vast crude oil reserves. Latest estimates on Venezuela's crude oil reserves show 8,500,000,000 bbl., which compares with 68,820,000,000 for the entire world.

Refinery runs in December showed that 55,884 bbl. daily were put through the Caripito plant and 8,248 bbl. daily at La Salina, for a total of 64,132 bbl. daily. This compares with 64,852 bbl. daily in November.

Twenty development wells were brought in, all oil producers, and two exploratory wells were completed, both oil producers also. No dry holes or gas wells were encountered. The fields where the wells were brought in, their average initial production and depth follow:

Development wells: Bolivar Coastal (B.C.F.), twelve, 638 bbl., 5,115 ft.; Temblador, three, 175 bbl., 4,052 ft.; Jusepin, two, 92 bbl., 4,936 bbl.; Quiriquire, two, 303 bbl., 3,818 ft.; and Mulata, one, 92 bbl., 5,055 ft.

Exploratory wells: Bolivar Coastal (B.C.F.), one, 250 bbl., 5,806 ft.; and Mulata, one, 9 bbl., 9,675 bbl.

U. S. Oil Companies Aid Venezuela Farm Program

BACKED largely by oil-industry capital, a new company has been formed in Venezuela to produce farm staples through advanced methods and use of modern equipment.

This announcement was made by the Venezuela Basic Economy Corp., a subsidiary of International Basic Economy Corp. of which Nelson A. Rockefeller is president. Robert P. Russell, formerly president of Standard Oil Development Corp., is vice president of both these corporations.

United States oil companies which operate in Venezuela and which have contributed their financial assistance to the expanded agricultural program are: Creole Petroleum Corp.; Colon Development Co., Ltd. (Shell); Mene Grande Oil Co., S.A. (Gulf); Texas Petroleum Co.; and Socony-Vacuum Oil Co. of Venezuela.

The new company, organized in Venezuela, is known as Productora Agropecuaria, Cia. Anonima, or Food Production Co. Corporacion Venezulana de Fomento, a Venezuelan Government agency, reportedly will subscribe to 50 per cent of the capitalization of the new company in the form of preferred stock.

PACA is one of several subsidiary companies being organized in Venezuela to engage in business enterprises in the field of food production and distribution, with the objective of improving living standards of the people. PACA has been incorporated with initial capital of 6,600,000 bolivars (about $2,000,000), which will be augmented as its projects develop and as commitments are made for the acquisition and rental of lands and the purchase of modern equipment, livestock, seeds, fertilizers and other goods.

Bill Would Nationalize Gas Industry in Britain

While the private-owned British gas industry plans to oppose vigorously the Labor Government's program to nationalize this industry in Great Britain, the bill has been published in London.

Private operators will take the stand that nationalization would hamper efficient operation of the industry, lead to bureaucracy, and result in higher prices to consumers, of which there are approximately 40,000,000.

Through the issuance of stock, the government plans to compensate private operators at a cost of between $720,000,000 and $800,000,000.

Britain has 1,050 separate gas concerns, one-third of which are municipally owned. This is said to represent an over-all invested capital of $1,048,000,000.

Just what effect the proposed nationalization program will have on postwar plans of private oil companies to modernize, enlarge and construct new facilities in Britain is not yet known. But private interests, a few months ago, indicated that their plans were being held in abeyance pending a clarification by the government on its nationalization plans.

Ethiopian Exploratory Work Halted by Sinclair

Sinclair Oil Co. last week announced it had suspended temporarily all its operations in Ethiopia. About 50 Americans engaged in exploratory work in the Ogaden Desert area were withdrawn to Diredawa.

Officials said the move was made because of disturbances in neighboring Somaliland.

The company in July 1945 received an exploratory concession in Ethiopia running up to 50 years.

Sofia Co. Exempted From Bulgarian Nationalization

The Bulgarian Government has decided to exempt the foreign-owned Sofia Enterprises Petrol Co. from the recent nationalization act which became effective last December 23, according to a Reuters dispatch from Sofia.

The company's installations at the Danube port of Rousse (Rustchuk) were still operated under this act, a government spokesman said, but the United States minister delivered a note to the Bulgarian Government asking it to re-establish the company's status quo as before nationalization.

Company shareholders (all foreign) eventually will be prepared to negotiate a transfer, according to the spokesman. While all staff members were dismissed when the company was nationalized, including the manager, Rudolph Wiezel, of the United States, and Rene G. Dummont, of Belgium, all have now been fully reinstated.

From some of Bulgaria's mountain areas there have been reports of large shale deposits. Oil may or may not exist in the so-called Eastern Star Plannina region of that country.

Installations which the Bulgarian Government originally planned (and may still) to nationalize are largely marketing.

New Oil Area Reported By Mexican Geologists

Mexican geologists believe they have found a promising oil region in the Sto La Marina area about 115 miles north of the Gulf Coast port of Tampico. Officials of Petroleos Mexicanos, the government oil monopoly, said that on the basis of these findings they would drill a test well on the San Jose de Las Rusas ranch.

Prior to government expropriation of private oil properties in 1938, the officials said, some exploratory work was done in this area by Imperial Oil Co. and Transcontinental Petroleum Corp.

International

WORLD-WIDE OIL DEVELOPMENTS

New Discovery in Mara District Is Reported

Creole Petroleum Corp. early this week declined to confirm reports that major oil deposits had been discovered in the Mara district of Zulia state. The discovery was reported by the press in Caracas.

Creole officials said the company had been carrying on exploratory work in the area for some time.

The Caracas newspaper said an exploratory well found the new pay in a formation at a considerable depth below current producing formations.

Mexico City Gas Pipe Line Work Under Way

Construction work is progressing on the natural-gas pipe line between Mexico City and Pozo Rica oil fields on the Gulf Coast 250 miles to the northeast and completion is expected during the current year, according to officials of Petroleos Mexicanos, the government oil monopoly.

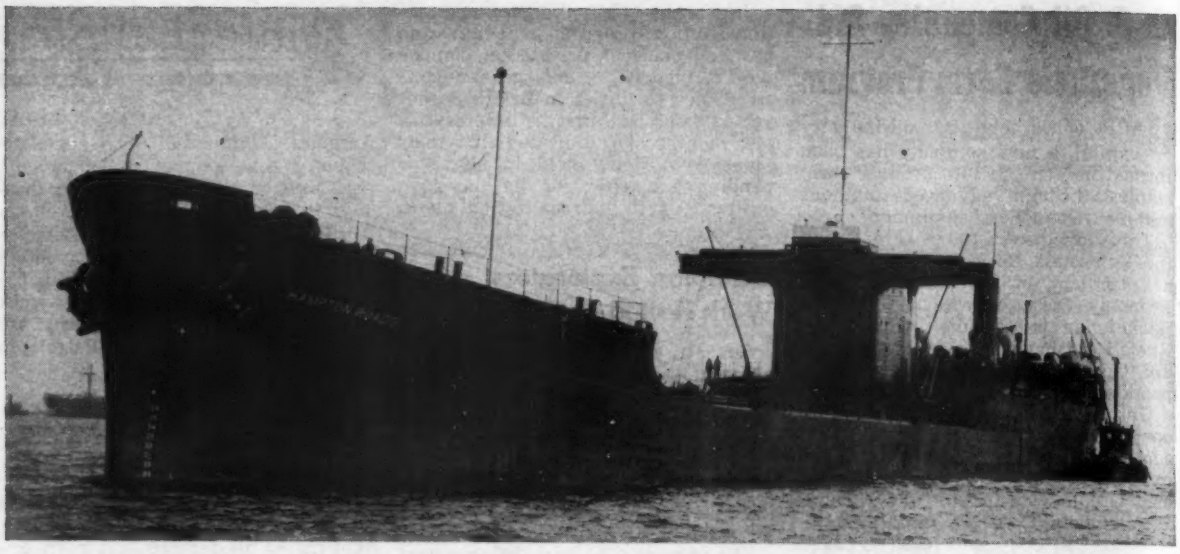
The line will supply 35,000,000 cu. ft. of gas daily, chiefly to industries since Mexico City lacks underground mains to homes.

Venezuelan Oil Sold to Italy

The first shipment of Venezuelan oil sold directly to Italy recently left from Caripito with 68,390 bbl. of oil valued at about $150,000. The shipment was sold at a price of 20.5 cents per barrel above current market prices.

Pacific Coast Group to Meet

Technical papers by industry engineers on oil well drilling and producing operations, as well as papers of general interest to the industry, will be featured at the annual spring meeting of the Pacific Coast district of the American Petroleum Institute to be held at the Biltmore Hotel, Los Angeles, May 6-7. Lot Bowen, of Western Gulf Oil Co., is general chairman for the 2-day affair.



Huge new tankers now ordered will dwarf normal tankers such as the Hampton Roads, shown here, a 24,000 DWT ship with a capacity of about 175,000 bbl. The new tankers, plans for which already have been announced, will have a capacity of about 230,000 bbl. The Hampton Roads is under charter to Socony-Vacuum Oil Co., Inc., to carry oil from Texas, the Caribbean, and the Middle East to the company's East Coast refineries

Company Plans Point to Lower Costs for Crude Imports From Middle East

by Warren W. Burns

THE probability that the world tanker shortage will be eased within a few months, plus recent announcements that a significant number of large and economical new tank ships are under construction, focuses attention on the prospect that before very long Middle East crude may be imported into the United States at prices considerably under current domestic prices.

At present charter rates quoted by U. S. Maritime Commission, Saudi Arabian crude could be brought to East Coast ports at costs sufficiently under the current market to provide a handsome profit for importers.

However, the commission has no tankers available for this service, and commercial charterers are obtaining such premiums as to make this movement prohibitive today. On the other hand, oil companies operating their own fleets doubtless could make this run at less than USMC rates if they could spare the vessels from other services.

While the present cost is favorable to such movement, lower costs still are needed.

The history of foreign oil operations has shown that royalty payments to foreign governments usually increase with the passage of years, and as output increases various taxes are imposed on operations. In short, it is highly unlikely that current all-over production costs will stay at present levels.

There are so many "if" factors involved when computing the laid-down costs of foreign crude, particularly as regards the Middle East, that almost any specific figure within reason can be proved right or wrong.

However, in endeavoring to determine an approximate per barrel cost of bringing Middle East crude oil to the United States East Coast, this writer was told by the companies directly connected with the Saudi Arabian operation that a 43-cent per barrel figure could be taken as reasonably accurate. This figure includes the royalty of 23 cents per barrel, which means that the production cost is estimated at 20 cents per barrel. This figure is an estimated production cost and allows for no margin of profit.

To move Saudi Arabian crude oil to the United States, a per barrel cost of about $1.69 should be added, on the basis of the maritime commission voyage charter rate of $12.70 per ton from Ras Tanura to New York. The $1.69 figure includes a 16-cent per barrel cost for the Suez Canal toll. So, with a 3-cent per barrel loading and unloading charge and the 10.5-cent per barrel United States import duty, the per barrel costs, broken down, would be:

Actual production cost (Saudi Arabia)	$0.20
Royalty	.23
Transportation from Ras Tanura to New York (U. S. Maritime Commission voyage charter rate)	1.69
Loading and unloading charge	.03
U. S. import duty	.105
Total	$2.255

Arabian American Oil Co. has set $1.30 per barrel f.o.b. Ras Tanura as its sale price for the first quarter of 1948. On this basis, assuming the same transportation charges, Middle East crude would cost $3.125 per barrel delivered in New York. However, tankers reportedly cannot be obtained today except on premiums ranging from 100 to 300 per cent above published rates. The $1.30 posted price, which also applies to Aramco's partners, was

established to create funds for expanded oeprations.

On completion of the trans-Arabian 1,040-mile 30-31-in. crude-oil pipe line, from Saudi Arabia's Abqaiq field to Sidon, on the Lebanese coast, it is estimated that the pipe-line transportation costs, per barrel, will approximate 30 cents. The USMC voyage charter rate from Haifa (about 40 miles south of Sidon) is $7.80 per ton, or $1.04 per barrel. Thus, with completion of this pipe line, the laid-down per barrel costs in New York, for Saudi Arabian crude oil, would look as follows:

Actual production cost (Saudi Arabia)	$0.20
Royalty	.23
Pipe line cost to Sidon	.30
U. S. Maritime Commission voyage charter cost	1.04
Loading and unloading charges	.03
United States import duty	.105
Total	$1.905

In the long run, transportation costs should be somewhat lower than current USMC rates. Thus, after completion of the trans-Arabian pipe line, say in 1951, and the easing of the tanker shortage, the above $1.905 figure may be decreased.

Assuming that private company tankers are used, on completion of the trans-Arabian pipe line, it has been estimated that the per barrel transportation cost, from the Middle East end of the Mediterranean Sea, to New York, would approximate 75 cents per barrel. This would mean that the above per barrel cost of $1.905 could be brought down to $1.615.

Figures Represent Actual Costs

Commenting on present-day estimated costs, one official pointed out that in figuring the laid-down costs of Middle East crude oil, one must remember that estimates made on completion of the trans-Arabian pipe line, may never be realized (that is, may never be as low) because the entire cost level probably will rise by 1951.

It should be remembered that the figures used here represent only the actual cost, and it is obvious that a more realistic price will be developed on the cost of competitive crudes.

Comparing Gulf Coast-East Coast laid-down costs, it can be seen that at the posted price in West Texas for a gravity crude oil comparable with most Saudi Arabian crudes, of $2.42 per barrel, the total laid-down costs in New York would be:

Posted West Texas price for 36°-gravity crude	$2.42
Gathering, pipe line allowance, marketing cost and pipe line tariff	.275
Loading and unloading charges	.03
Transportation	.38
Total	$3.105

The $3.105 price reflects a profit, whereas the $2.255 and $1.905 figures represent actual costs insofar as it is able to estimate such costs.

Confirming earlier reports that future tanker construction would show a tendency toward an increase in carrying capacity, the American Bureau of Shipping last week stated that while the Ulysses is now the world's largest tanker (27,928 DWT with a capacity of about 200,000 bbl.) it "will retain this status only until the first of two duplicate tankers, being constructed for the National Bulk Carriers by Welding Shipyards, is completed later this year." These larger tankers are expected to be a 30,000 DWT and presumably will be used largely in the Middle East-U. S. East Coast run.

18 Tank Ships Ordered

The oil industry has placed orders for a total of 18 tank ships aggregating 278,690 gross tons and 466,000 DWT, with propelling machinery totaling 206,300 hp. "These orders will serve temporarily to keep alive our vital shipbuilding industry and enable them to maintain the nucleus of a trained and skilled staff," J. Lewis Luckenbach, president of the American Bureau of Shipping, said.

Socony-Vacuum Oil Co., Inc., has announced, "as part of a long-range program to relieve the drain on oil resources of the United States," completion of negotiations for acquiring seven new tankers larger than any now in use in the company's fleet. Moreover, Socony-Vacuum specifically stated that these tankers "will be used to transport crude oil from the Middle East and from South America to Socony-Vacuum refineries on the East Coast." Thus crude oil from the Gulf Coast states will be made available to the company's Texas and Middle West refineries, it was pointed out.

The seven Socony-Vacuum tankers, as well as two for Standard Oil Co. of New Jersey and two for Gulf Oil Corp., will be among the world's largest and will be built by Sun Shipbuilding & Dry Dock Co. The vessels will be 600 ft. long with a beam of 82 ft., 6 in.; depth of 42 ft., 6 in., and deadweight tonnage of 26,000. The propulsion will be single screw geared turbines and shaft horsepower of 12,500, with a speed of 16 knots and cargo capacity of 230,000 bbl.

Sun Shipbuilding is planned to lengthen five of its shipways and get the preliminary construction under way at an early date. Delivery of some of the tankers is expected by summer of 1949. Pending delivery of these new vessels, Socony-Vacuum has several tankers under charter for importing crude oil from its producing areas abroad—specifically Venezuela and the Middle East. Actually seven of the tankers will be built for Tankers Navigation Co., Inc., and chartered to Socony-Vacuum. Cost of each tanker may approximate $5,500,000.

Jersey Standard has two additional tankers planned, to be built by Newport News Shipbuilding and Dry Dock Co.

So-called "Greek interests" (whose identity was not otherwise disclosed) have ordered four tankers from Bethlehem Steel Co.'s Sparrows Point yards near Baltimore. The Greek tankers reportedly will be 524 ft. long, 68 ft. in beam with a draft of 37 ft. ,6 in. They will be driven by 6,050 hp. turbines. Each is listed as of 10,750 gross tons and 18,000 DWT.

The privately-owned American flag tanker fleet of 351 units, totaling 3,580,200 gross tons, is one of the most modern national fleets in the world, averaging 10 tons of age, almost 14 knots and about 14,700 DWT, Luckenbach pointed out. The fleet has a greater carrying capacity than the prewar fleet of 377 units, aggregating 2,675,075 gross tons. While the Maritime Commission at one time owned about 750 tankers, practically all of these have now been allocated for sale to American and foreign interests, or, in the case of old and damaged vessels, sold for scrap. A few tank ships will remain in the laid-up fleet, or be retained by the military services.

A total of 262 T2-SE-A1 turbo-electric drive tankers have been transferred from U. S. Government ownership. Of these, 101 will be operated under the American flag and 161 under foreign flags.

This month is expected to see the end of the tanker bottleneck, on the East Coast at least, according to James P. Patterson, president of Pan American Petroleum & Transport Co., who is also tanker committee chairman of National Petroleum Council. Most of the U. S. Maritime Commission deliveries should be completed before March 1.

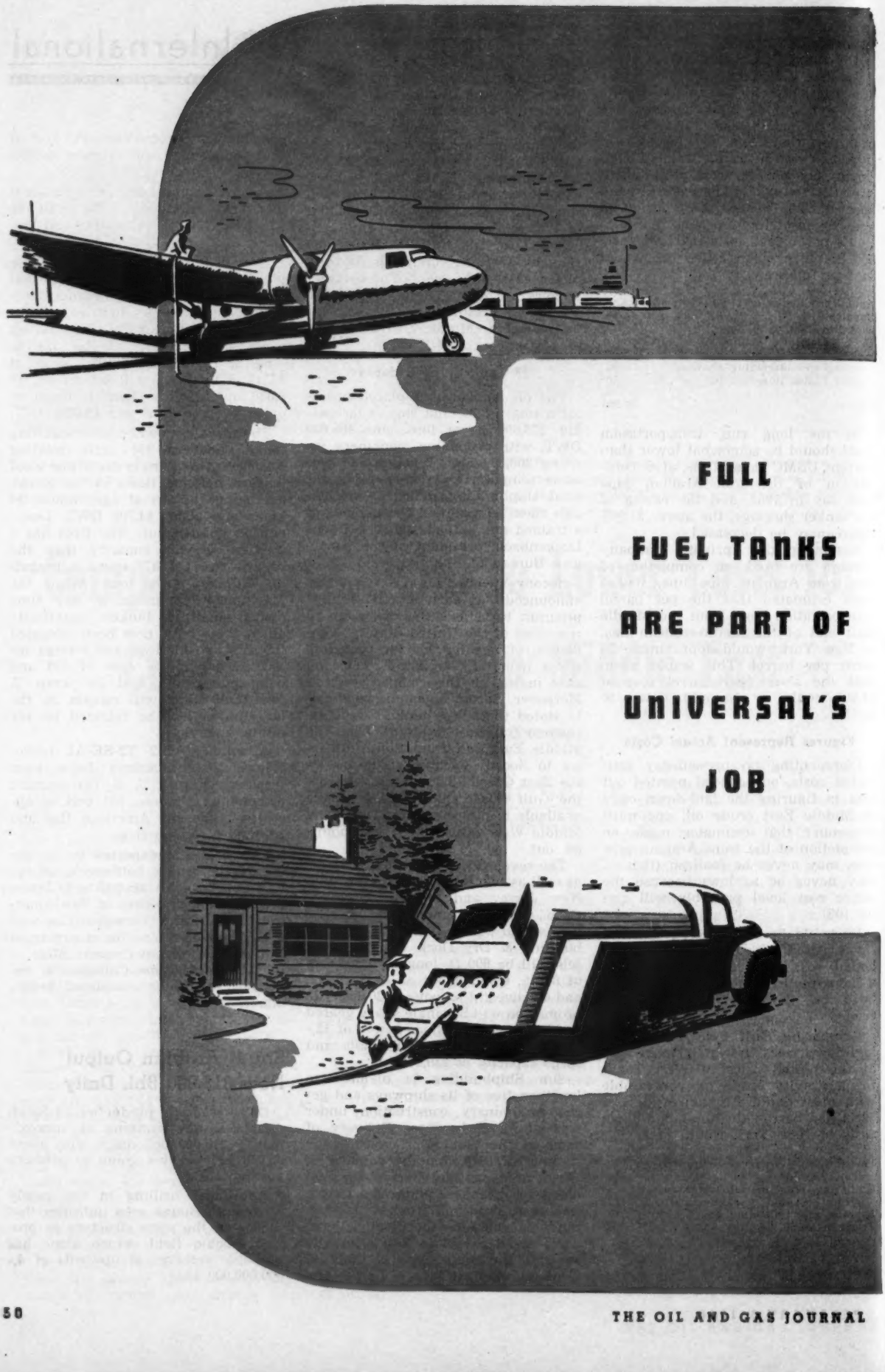
International

WORLD WIDE OIL DEVELOPMENTS

Saudi Arabian Output Now 315,000 Bbl. Daily

Daily crude-oil production in Saudi Arabia is now running at approximately 315,000 bbl. daily, with about 85,000 bbl. of this going to offshore destinations.

Additional drilling in the newly discovered Buqqa area indicates that this is on the same structure as prolific Abqaiq field, which alone has probable reserves of upwards of 4,000,000,000 bbl.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WASHINGTON WATCHING

BY BERTRAM F. LINZ

Controls Stampede

WASHINGTON.—It looks as though Republican leaders in Congress will have to use all their force to head off what has all the earmarks of a stampede to dump the shortages of oil, steel, and other materials in the lap of the Government with instructions to "do what it can" about them.

A number of bills to do just that, more or less, already have been introduced or are being readied for submission, many of them authored by members who know there is nothing the Government can do that industry is not already doing in an effort to step up supplies.

Most of the bills will be in answer to complaints of constituents who are finding it difficult to secure oil, steel, or something else for business or personal use, but some of them have been written by administration stalwarts who hope to develop a "demand" for legislation that will be irresistible.

From the standpoint of the oil industry there is grave danger that a confused Congress may pass legislation which will give the President practically blanket authority over allocations and prices. The Republicans didn't do too well in writing the legislation passed last month, providing for voluntary agreements, and inadvertently included some provisions that went further than many desired and have provided an excuse for the alleged "slow down" the administration is charged with using to discredit the voluntary method and emphasize the necessity for mandatory controls.

As an example of the slowness with which the administration is moving, it was learned that answers started to come in only last week to letters which Sen. Charles W. Tobey of New Hampshire sent the government departments December 19, suggesting how they could cooperate to save oil in line with the suggestions of industry. And in a long letter, the State Department outlined the difficulties involved in carrying out frequently repeated suggestion that it seek an agreement raising the load-line on world tankers, as was done for coastwise service by the Coast Guard last year.

Steel's Rebuttal

THE oil and natural gas industries complain of the lack of steel, but the steel industry this week was complaining of the lack of oil and natural gas, again demonstrating the interdependence of modern industries and the delicate balances which it sets up.

Ingot production is reaching peacetime high levels, but the gas and oil shortages are hampering finishing mill operations, a situation which is expected to continue until the end of the quarter, when warmer weather will ease the pressure on fuels, the steel industry reported.

In other fields, too, this dependence of one industry on another is making itself felt. It is the basic reason, for instance, for Gen. Lucius Clay's proposal to put Germany on an oil basis, a matter which now is under consideration in the State Department.

Seeking to increase German steel production so as to speed up reconstruction of industry, Clay found it was impossible without more coal. Turning to the coal industry, he was informed production could not be increased without more steel. To cut the knot, Clay would use oil to get the other two industries moving, a logical move but one which runs smack into the realities of a world oil shortage, and more directly our own oil situation.

In this country, the recent cold spell found factories closed down because their supplies of natural gas were cut off, and manufactured gas companies appealed to consumers to conserve because they could not get oil to make gas.

Toward Oil Security

SECRETARY of the Interior J. A. Krug this week laid out a four-point program for expanding liquid fuel supplies to meet the demands of an increasing population which, he said, may reach 165,000,000 by 1990.

The first two steps projected by the secretary are an inventory, which involves the geologic mapping of the entire nation to see where possibilities of additional reserves may be found, and the discovery of new oil fields in order to remove the pressure upon present producing areas.

In these efforts, he said, the Geological Survey will assist by systematic investigations in many parts of the country, to focus attention on areas attractive for exploration and to provide a sound groundwork of regional geologic information by which the search for new pools can be guided.

A third step will be the development of techniques to increase output through secondary recovery, to which, Krug said, the best scientific efforts of both Government and the industry must be directed.

The fourth point in the program, however, appears to be the one in which Krug has most faith and for which he has recently been plugging energetically. As might be expected, that is expansion of synthetic fuels research, in which he has been drumming up interest to support a $30,000,000 3-year extension of the program approved last week by a Senate subcommittee.

The secretary's theme song is, that while exploration and conservation are required, it is imperative that the nation look beyond them if it is to achieve petroleum security.

Unyielding Control

OIL and propaganda are the weapons of a cold war being waged by Russia against the western democracies which is barring the recovery of Austria, now under Four-Power occupation rule, it is disclosed by reports of Lt. Gen. Geoffrey Keyes, United States high commissioner.

Throughout his reports, Keyes refers frequently to the "unyielding attitude" and refusal of the Russians to discuss important questions which must be settled if the mission is to achieve its aim of reestablishing "a free, independent and democratic Austria with a sound economy, capable of insuring an adequate standard of living."

Keyes' recent reports tell of efforts of the high commissioners of the four powers to resolve the long-standing disagreement concerning the allocation and distribution of petroleum products.

The British have charged the soviet with violation of the Allied Resolution of 1946 which placed all Austrian indigenous resources under the control of the Austrian Government, basing their case on figures showing that between August 1946 and September 1947, Soviet-controlled deliveries of petroleum products amounted to only 470,000 metric tons, against allocations of approximately 900,000 tons.

It is further charged that the soviet administration has shipped considerable quantities of Austrian oil products eastward by rail, by the Danube, and to Czechoslovakia.

The United States, British, and French commissioners proposed that the Austrian Government be given exclusive responsibility for the allocation of indigenous oil products, as a solution of the controversy but, Keyes reported, "the Soviet high commissioner, according to a now firmly established tradition, refused to discuss the question as 'not falling within

the jurisdiction of the Allied Council'."

"In his view," Keyes commented, "it had been 'decided at Potsdam'."

The latest figures available are for last October. They show that of the official minimum requirements for Austria of 49,891 metric tons for the month, soviet deliveries amounted to only 29,947 tons, of which 1,996 tons were for Soviet-controlled industries. This threw on the United States Government the burden of attempting to keep Austria going, oilwise, by dollar purchases of 3,558 tons, but even at that it was possible to provide only 67 per cent of the minimum requirements.

While the Russians have never come within 5,000 tons of meeting total Austrian requirements for fuel oil in any month, and in October fell about 8,000 tons short, they seem to have adopted a particularly tough attitude toward the United States zone. That zone has requirements of about 3,200 tons a month; the soviet has never delivered much over 1,300 tons in any month and in February supplied less than 100 tons and in October only 300 tons. In the latter month, as against the 10 per cent given the United States zone, the French zone got 48 per cent of its requirements, the British zone 64 per cent and the soviet zone 69 per cent.

Military Urgency

ITS petroleum investigation hasn't progressed very far, but the House armed services oil subcommittee already appears convinced of the necessity for doing everything possible to increase our liquid fuel resources, from the standpoint of military necessity if no other.

Subcommittee members were impressed with the testimony of Defense Secretary James V. Forrestal, and the information given in executive sessions by military experts did nothing to dispel the sense of urgency which he gave the subject of developing new resources, natural and synthetic.

The immediate step which the subcommittee can take is to approve the Navy's plans for continuation of its exploration program in Alaska, now due to come to an end next year, and its study of the deposits in the Elk Hills reserve, which shortly will be extended considerable distance to the south and west to add 7,000 acres to its area.

These are matters which come directly under its jurisdiction, but other things which military experts believe would add to our resources are subjects which would have to be dealt with by other committees—government assistance for secondary recovery, disposition of tideland oil fields and extension of synthetic fuels research program.

While he is cognizant of his limited authority, subcommittee chairman Dewey Short of Missouri believes that information on every phase of the oil question is essential to intelligent consideration of problems coming before his group. Unlike most congressional bodies the subcommittee has laid down on paper just what subjects it will question witnesses about, a list of 42 items running from the needs of the armed forces to the transportation problems affecting the production of synthetic fuels and ranging geographically from Alaska to Saudi Arabia.

Harriman Slashes First Quarter Export Quotas

WASHINGTON.—Facing mounting pressure in Congress for an embargo on exports of oil, Secretary of Commerce W. Averell Harriman last week slashed the first-quarter allocation for controlled products by 2,200,000 bbl. and practically wiped out a special allocation of 1,600,000 bbl. of distillates which had been set up for Japan and the Ryukus Islands.

At the same time, Harriman announced that export licenses would be limited through the remainder of this quarter to shipments from "those areas of the country where the fuel can best be spared during this emergency period."

Under Harriman's order, the allocations of controlled products will be as follows: Aviation gasoline, 700,000 bbl., unchanged from the original quota; motor gasoline, cut from 5,250,000 to 4,550,000 bbl.; kerosine, cut from 900,000 to 600,000 bbl., gas oil and distillate fuel oil, cut from 3,200,000 to 2,800,000 bbl.; residual fuel oil, cut from 1,800,000 to 1,000,000 bbl.; blending agents, 150,000 bbl., unchanged.

Bills Creating Tidelands Procedure Being Prepared

WASHINGTON.—Legislation providing for administration of the California tideland oil fields by the Government will be sent to the judiciary committees of House and Senate within a few days, probably this week.

Details of the measure have been worked out by Secretary of the Interior J. A. Krug and Attorney General Tom C. Clark who visited the White House January 27 to lay them before President Truman, a move which is being interpreted in some quarters as indicating that the President is prepared to oppose pending legislation to return the lands to the state and relinquish all Federal claims to tidelands anywhere in the country.

In another move to cement the Government's control of the tidelands, Clark filed an application with the Supreme Court to determine the boundaries of the area over which the court last June said the Government had paramount rights.

Commercial Atomic Energy Use Far Off, Congress Told

WASHINGTON.—The United States Atomic Energy Commission told Congress this week that commercial atomic power will not be available to meet any of our energy needs for some years to come.

The commission, submitting its semiannual report, expressed the belief that it will not be possible, under the most favorable circumstances, to have any considerable portion of the world's power supply derived from nuclear fuel before the expiration of 20 years. Probably 8 to 10 years will be required to solve technical difficulties and put a useful, practical demonstration plant in operation, the commission said.

Champlin Named Head of Public Relations Body

Ralph C. Champlin, director of employe and public relations for Ethyl Corp. and vice chairman of the American Petroleum Institute's public-relations operating committee, has been named chairman.

In this capacity Champlin succeeds Franklin Waltman, public-relations manager of Sun Oil Co. Waltman remains on the committee board of directors.

Jersey Standard Becomes Esso Standard in Change

Standard Oil Co. of New Jersey, operating subsidiary of Standard Oil Co. (N.J.), has changed its name to Esso Standard Oil Co.

M. J. Rathbone, president, said the move was made to give "formal recognition" to the familiarity of the public with the company's marketing trademark.

Esso Standard operates refineries at Bayonne and Linden, N. J.; Charleston, S. C., and Baltimore, Md. Its Louisiana division operates a refinery at Baton Rouge.

The assets and business of Colonial Beacon Oil Co. recently were transferred to the company, which for many years has owned substantially all the stock of Colonial Beacon.

Public Relations Leaflets Ready

Two leaflets prepared by the industry's public-relations operating committee have been sent to the district committees and are now available to the industry through them. They are "Plain Talk on Oil Today," and "Save Oil for Comfort."

A.I.M.E. Petroleum Group Will Discuss Economics at New York

ECONOMIC factors bearing on future trends in the oil industry have a prominent place in the program of the petroleum division of the American Institute of Mining and Metallurgical Engineers during the 1948 annual meeting in New York February 15-18.

These discussions have been grouped for the afternoon session of February 17. Developments in the gasification of coal to obtain liquid hydrocarbons will be described by Frank A. Howard, New York consultant who was until recently president of Standard Oil Development Co. and vice president of Standard Oil Co. (N.J.). M. G. Gamble, general manager of Standard Oil Co. (N.J.) marine department, will discuss petroleum transportation with special references to tankers. C. J. Bauer, head of the same company's foreign economics division, will talk on the place Middle East oil will occupy in the world's markets. H. J. Struth, Dallas, chairman of the committee which arranged the economics program, and J. E. Heston, of Petroleum Advisers, Inc., New York, will be associate chairmen of this session.

Report on World Production

Reports on worldwide production and major developments during 1947 will be given on the morning of February 17 by 11 regional experts who will make use of data compiled by 66 state, district, or foreign-country analysts. The regional reports will be given as follows: North America, except the United States, G. S. Hume; northern South America, A. J. Freie; southern South America, A. A. Curtice; Middle East, J. Terry Duce; Europe, Ray P. Walters; and India and Indonesia, E. W. Berlin. Domestic regions will be reported by E. P. Hayes, southern United States; Robert J. Beams, Mid-Continent; R. M. Larsen, Rocky Mountain; and G. E. Eddy eastern United States. This statistical and development discussion has been arranged by a production review committee under E. G. Dahlgren, Interstate Compact Commission, Oklahoma City, and D. V. Carter, Magnolia Petroleum Co., Dallas.

A production technology program on the morning of February 18 features Henri G. Doll, Schlumberger Well Surveying Corp., Houston, on theoretical analysis and principles of interpretation of the spontaneous potential log; C. F. Weinaug, of the University of Texas, on revaporization of retrograde condensate from sands; and J. N. Breston and Richard V. Hughes, of the Penn Grade Crude Oil Association, on pressure and recovery in long core water floods. Associate chairmen for this meeting will be John H. Murrell, of DeGolyer & MacNaughton, Dallas, the petroleum division officer in general charge of the entire meeting, and Paul Fitzgerald, Dowell Incorporated, Tulsa.

The petroleum division dinner on February 17 will have as its principal speaker J. E. Brantly, president of Drilling & Exploration Co., Dallas, who will speak on "Development of Natural Resources in Foreign Countries." This dinner will mark the installation of petroleum division officers for 1948. They are: I. W. Alcorn, Pure Oil Co., Houston, chairman; Carlton Beal, consultant, Los Angeles, and Paul Fitzgerald, Dowell Incorporated, Tulsa, as vice chairmen. Members of the executive committee, in addition to the officers, will be Howard C. Pyle, president of Continental Consolidated Corp., Long Beach, the outgoing chairman; W. V. Vietti and S. E. Buckley, of Houston; W. W. Porter II and John Sherborne of Los Angeles; John Murrell of Dallas; and Benjamin C. Craft of Baton Rouge.

Curtice Sees Open-Door Policy in Latin America

MANY Latin American nations are getting ready to open their doors to foreign capital for oil development and within the next 2 to 5 years it should be possible for United States oil companies to operate in most of them, it is predicted by A. A. Curtice, president of the consulting engineer firm of Hoover, Curtice & Ruby, New York.

Addressing the annual dinner meeting of the Tulsa chapter of Nomads February 2, Curtice described geological and political conditions in Central and South America.

"I may be wrong," Curtice told the group, "but I predict that most of these governments are beginning to realize that they cannot develop their petroleum resources without foreign capital and know-how, and within a few years they will modify their oil laws so as to make it attractive for American operators to do business there."

Mexico, Curtice said, will never return to its former practice of granting unrestricted concessions but sooner or later it will offer contracts or deals attractive to American operators; particularly the smaller companies. Even Argentina, he said, is showing signs of opening the gate enough to permit foreign firms to operate on a contract basis or perhaps obtain a concession jointly with the government oil monopoly.

The speaker gave his opinion that new and reasonably favorable petroleum laws would be enacted during the next 2 to 5 years in Brazil, Guatemala, Costa Rica, Colombia, and Peru, in spite of the political situations which have blocked such legislation recently. He added the opinion that the government monopolies now attempting to develop oil in Chile and Bolivia will not be successful in meeting demands within those countries, and declared that every Western Hemisphere nation has the obligation under the Rio de Janeiro agreement to supply its own oil needs from indigenous production if physically possible.

Senate Group Approves New Synthetics Program

WASHINGTON.—Following a brief hearing last week, a Senate public lands subcommittee favorably reported the O'Mahoney bill to extend the Bureau of Mines' synthetic-fuels investigation for another 3 years, with an additional authorization of $30,000,0000.

Appearing before the committee, E. V. Murphree, president of Standard Oil Development Co., testified he was for the program "in general" although he thought the bureau's demonstration plant was "too big." His company, he said, never spent a million dollars on any plant designed for pilot purposes.

Sen. Joseph C. O'Mahoney of Wyoming, author of the original bill, explained that the bureau has been retarded in its program and will be unable to finish it within the 5 years originally assigned for the work, while at the same time costs have gone up so greatly that the original appropriation of $30,000,000 must be doubled.

He also said that a number of interests are engaged in or considering synthetic fuel research, naming Standard Oil Development Co., which is making estimates with Bureau of Mines experts for the establishment of a coal-hydrogenation plant capable of producing 30,000 bbl. daily; Pittsburgh Consolidated Coal Co., which is working with Standard Oil Development on gasification of coal; Union Oil Co. of California, which will construct a retort to process up to 50 tons of oil shale daily; Sinclair Oil Co., and Standard Oil Co. of California, the latter testing pipe-line transportation of crude made from shale.

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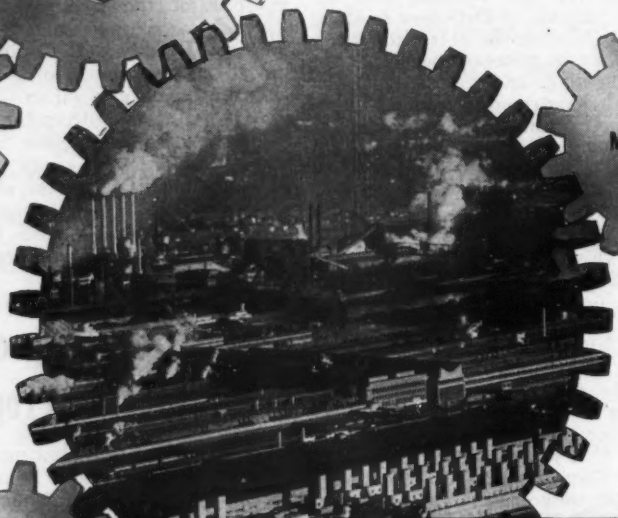

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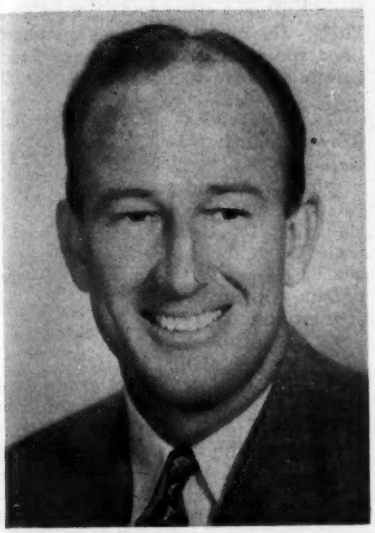


Sunray Vice President Heads New Department

DON O. CHAPELL, recently made vice president of Sunray Oil Corp., in charge of the new department of exploration, arrived early this week in Tulsa where he will take up his new duties.

Chapell, who was appointed to this new position effective January 1, was formerly division geologist for Sunray at San Antonio. His appointment marks the first step in the company's new program of activity and expansion that it is planning in the Mid-Continent states and California.

He was former district geologist for Shell Oil Co., Inc., at Ardmore, Okla., becoming associated with the former Transwestern Oil Co. as division geologist, at Oklahoma City in 1937. He was made division geologist for Transwestern at San Antonio in 1940 and continued in this capacity until the merger of Transwestern into Sunray. He was then made manager of Sunray's southwest Texas land and geological office, San Antonio, when the Tulsa company acquired the Transwestern properties in 1946.

The new vice president is a former resident of Okmulgee, Okla. He was graduated from the University of Oklahoma with a B.S. degree in geology in 1932.

Dr. Gordon M. Kline, chief of the organic plastics section at the National Bureau of Standards, has been appointed assistant chief of the division of organic and fibrous materials. Kline is particularly known to the oil industry for his research work in polymerization of olefins and was one of the first American scientists to investigate the German plastics and chemical industries. **Dr. Robert D. Stiehler,** with the Bureau since 1946 and prior to that with the Office of Rubber Reserve, has been appointed chief of the testing and specifications section of the division of organic and fibrous materials. Stiehler was instrumental in developing methods of quality control for synthetic rubber production in government plants during the war.

Max B. Ederington, superintendent of the Northwest (Montana-Wyoming) district of Interstate Oil Pipe Line Co. at Billings, Mont., has resigned to take a position as superintendent of the Andian National Corp., Ltd., in Colombia, South America. Andian operates a 350-mile crude-oil pipe-line system used in transporting Colombian production to a deep water ship terminal at Mamonal, on the bay of Cartagena.

R. W. Dudley, Pure Oil Co., has been elected president of the newly organized Fort Worth Geophysical Society. Other officers named were: **P. H. Ledyard,** vice president of Southern Geophysical Co., vice president; and **Erik Thomsen,** Stanolind Oil & Gas Co., secretary-treasurer.

Gage Lund, who has been chairman of the board of California Co. and Standard Oil Co. of Texas, has been elected to the board of directors of Standard Oil Co. of California. Lund joined Standard in 1925 graduating from Stanford. He worked as a geologist and drilling foreman in the Rocky Mountains and Texas for 11 years and then was made division superintendent of California Co.'s Gulf Coast division in Houston. In 1938 he was made assistant manager of all operations of California Co. and Standard Oil Co. of Texas and 3 years later was elected president of California Co.

William P. Gaynor, Jr., for 35 years with Overseas Tankship Corp. and other affiliates of Standard Oil Co. of California and The Texas Co., has been appointed general manager of Overseas Tankship.

P. T. Jenkins, geologist for Carter Oil Co. at Billings, Mont., has resigned to join Seaboard Oil Co. of Delaware as district geologist at Casper, Wyo.

Ralph W. Garrett, of the legal department of Sinclair Oil Corp. since 1916, has been named general counsel for Sinclair Prairie Oil Co. and other operating subsidiaries to succeed **Edward H. Chandler,** who has resigned. Garrett, well-known attorney in the oil industry, started with Sinclair Oil & Gas Co. in 1916 in Tulsa. With the exception of 4 years spent in Texas he has been in Tulsa since joining the company. Garrett is a graduate of University of Nebraska where he obtained his law degree.

R. W. GARRETT

E. H. CHANDLER

Chandler, who in 1916, was appointed general counsel of Sinclair Oil & Gas Co. and other operating subsidiaries, will continue with the company as special counsel and in an advisory capacity. He graduated from the University of Michigan in 1906. After practicing law in Independence, Kans., he moved to Tulsa in 1913 where he became associated with the Sinclair interests. When Sinclair Oil & Gas Co. was changed to Sinclair Prairie Oil Co. in 1932 Chandler continued as general counsel. Chandler was long associated with the Mid-Continent Oil and Gas Association and other oil groups.

Norman Thompson, formerly of the development division of Sun Oil Co., has been appointed assistant superintendent in charge of refinery laboratories at Sun's Marcus Hook refinery. **George S. Rostron** has been named special assistant to Thompson. **Charles C. Kline** has been named operating engineer of a new wax manufacturing plant and new furfural solvent extraction plant.

W. W. McDonald, geologist, has been placed in charge of the newly opened Taylor Refining Co. office in San Antonio.

Lewis Finch, Jr., formerly in the division office of Stanolind Oil & Gas Co. in Fort Worth, has been named superintendent of production for Stanolind's West Texas district. **L. E. Sloan,** formerly superintendent for the West Texas district, has been

PERSONALS

transferred to Pampa, Tex., and placed in charge of the Panhandle district. The new production office at Lubbock is under the direction of **J. E. Wooten.**

Lloyd L. Jordan, chief engineer of the Arkansas Oil and Gas Commission for 4 years, has resigned to become natural-gas engineer of Shell Oil Co., Inc., at New Orleans.

H. R. Straight, chairman of the board of directors of Cities Service Oil Co., Bartlesville, Okla., has retired after more than 36 years with the company. He remains a director of Cities Service Oil Co. (Del.). In 1937 he was elected president of Cities Service and in 1946 was made chairman of the board. Straight, a native of Pennsylvania, graduated fram Stanford University. After graduation he entered the oil business with his father who at that time was a prominent independent operator of Pennsylvania. In 1911 Straight moved to Oklahoma where he was employed by the T. N. Barnsdall interests.

Allen Ehlers, Skelly Oil Co. geologist at Tulsa, has been named district geologist for Skelly Oil Co. for West Texas and New Mexico, at Midland.

J. C. Hill, district superintendent for United Gas Pipe Line Co. in the Beeville, Tex., district, has been transferred to Shreveport where he will be in charge of field work for the newly created general office gas-supply department.

C. L. Hand, manager of the marine department of The Texas Co. at Port Arthur, Tex., has retired. **J. H. Norville** has been promoted to assistant manager of the marine department's operating division and **F. W. Bucklin** has been named port engineer. Hand will remain in Port Arthur in an advisory capacity for the company's marine operations.

Theodore C. Coleman, formerly an official of Northrop Aircraft, Inc., has been appointed assistant treasurer of Standard Oil Co. of California.

W. B. WATSON

William B. Watson, formerly in the production and engineering departments of Gulf Oil Corp., has joined **David Donoghue,** consulting geologist and engineer, Fort Worth. Watson is now completing requirements for his master's degree in petroleum engineering at the University of Texas where he is a member of the honorary engineering and geological fraternities.

J. B. Hinkle of Hinkle Oil Co., Wichita, was elected president of the Kansas Independent Oil and Gas Association for 1948 at the tenth annual meeting in Wichita recently. Other officers named were: **John M. Denman** of Sedan, Kans., **Frank Zimmerman** of McPherson and **W. J. Coppinger** of Wichita, vice presidents; **L. E. Smith,** Wichita, treasurer; **R. L. Williams,** Wichita, secretary; and **Jack L. Worley,** executive secretary. **E. B. Shawver** was named a permanent honorary vice president.

Hugh B. Key has been promoted to manager of the land department of Mid-Continent Petroleum Corp., Tulsa. He has been acting manager since the recent death of Jess Scarborough, vice president.

G. Stewart Brown, deputy director of the office of information and educational exchange of the State Department, has resigned to become manager of the public-relations department for Standard Oil Co. of California. After graduation from the University of Arizona in 1927 he joined the staff of the Paris edition of the New York Herald Tribune. Since that time Brown has served in newspaper work and public relations with United Press in Europe, the American Red Cross in Washington, the Allied Commission in Italy, and the United States Information Service in Italy.

Harry H. Arnold Jr., assistant manager of the Oklahoma division for The Texas Co., has been appointed assistant division manager of the Rocky Mountain division, producing department, with headquarters in Denver. Arnold joined The Texas Co. at Houston in the geophysical department in 1927. After serving as district geologist for the company at Shawnee, Okla., he was named Oklahoma division geologist in 1938.

New officers of the Southwest Texas section, American Institute of Mining and Metallurgical Engineers, are shown here: Paul R. Trumbull, Humble Oil & Refining Co., Corpus Christi, retiring chairman and new director; Charles H. Snelson, Seaboard Oil Co. of Delaware, Corpus Christi, director Thomas S. West, Blanco & Buchanan, San Antonio, new vice chairman; H. N. Lyle, Engineering Service Co., Corpus Christi, new chairman; Raoul J. Bethancourt, Sun Oil Co., Corpus Christi, new secretary-treasurer; E. H. Lancaster, Jr., Humble Oil & Refining Co., Corpus Christi, and E. C. Sargent, Puenticitas Oil Co., Corpus Christi, both directors. Dr. Frank Dotterweich, A. & I. College, Kingsville, new director, is not in the picture

J. Allan McCaw, purchasing agent for Shell Oil Co., Inc., at Calgary, has been transferred to Montreal.

George Gibson, former director of construction, Petroleum Administration for War and a consultant on refinery construction, has been appointed New York representative for Bechtel Corp. In 1941 Gibson was made materials specialist for the refining division of the PAW. In 1944 he was made director of construction and placed in charge of construction in the Government's program for aviation gasoline production.

George Dunaway, formerly with Phillips Petroleum Co. at Shawnee, has joined Blackwell Oil & Gas Co. geological staff.

William P. Morrison has been named in charge of the land department of Davon Oil Co., Oklahoma City. He succeeds **Ross Mayo,** recently turned independent.

Tom Graham, independent oil operator, has been named president of the Corpus Christi Chamber of Commerce.

M. C. Brunner, acting district production superintendent for Shell Oil Co., Inc., at Hobbs, N. M., has succeeded **Charles C. Roripaugh** as production manager for Shell's Midland, Tex., area effective February 1. Brunner has been with the company since 1926. After 4 years' service in the Army he was for a time assistant to the regional vice president at Houston before being transferred to Hobbs. Roripaugh has served nearly 20 years with Shell in producing activities.

Ward T. Jones, Houston, has been appointed general attorney in charge of the Houston division of the legal department of Continental Oil Co. Jones previously was Louisiana attorney for the company.

H. A. Hassan, vice president of Sinclair Refining Co. and of Sinclair Petroleum Co. (the latter the Ethiopian organization) has returned to New York after an extended trip to Ethiopia.

William A. Waldschmidt, Argo Oil Corp., has been elected president of West Texas Geological Society. Other officers named include: **Sam C. Giesey,** Union Oil Co., vice president; **Clyde W. Turner,** Gulf Oil Corp., secretary; and **Jane Marie Johnson,** Permian Basin Sample Laboratory, treasurer.

Frank D. Manning, of the exploration and land department for Stanolind Oil & Gas Co. at Amarillo, Tex., has been transferred to Bogota, Colombia, where Stanolind is opening a division office for its newly created foreign exploration department. Manning will be in charge of the land department. **Hugh Garrison,** formerly in the East Texas office of Stanolind at Tyler, has succeeded Manning.

Dean Sheldon, consulting petroleum engineer, has been elected chairman of the Pacific Petroleum Chapter, petroleum division, American Institute of Mining and Metallurgical Engineers for 1948. Other new members elected to serve on the council are: **Paul Andrews,** chief petroleum engineer, Signal Oil & Gas Co.; and **Harold Clark,** chief reservoir engineer, conservation committee, California Oil Operators. **Ray Elner,** district manager, Kobe, Inc., 1948 chairman of the junior division, and **John McMillan,** manager of field operations for Fullerton Oil Co., are members ex-officio of the council.

SHIFTS—

James S. Hopkins, foreman, Amerada Petroleum Corp., Delano, to Santa Barbara, Calif.; **R. W. Blackburn,** engineer, Continental Oil Co., Hobbs, N. M., to Big Spring, Tex.; **R. N. Bills,** geologist, Amerada Petroleum Corp., Carrizo Springs to Robstown, Tex.; **James C. Farris,** engineer, Stanolind Oil & Gas Co., Fort Worth to Brownfield, Tex.; **T. R. Coffield,** engineer, Gulf Oil Corp., Wickett to Crane, Tex.

Lee Bell, foreman, Sun Oil Co., Arabi, La., to Nederland, Tex.; **Arthur A. Kauffman,** engineer, Socony-Vacuum Oil Co., Inc., Emporia to Grantville, Kans.; **L. B. Goodson,** engineer, Phillips Petroleum Co., Bartlesville to Okmulgee, Okla.; **L. L. Chisholm,** superintendent, Danciger Oil & Refining Co., Shawnee, Okla., to Fort Worth, Tex.; **H. T. Hunter,** engineer, Stanolind Oil & Gas Co., Tulsa, to Oklahoma City.

E. W. Showen, engineer, Gulf Oil Corp., Crane to Wickett, Tex.; **Paul Lewis,** foreman, Shell Oil Co., Inc., Gonzales to New Iberia, La.; **E. L. Wells,** foreman, Continental Oil Co., Sulphur to Madill, Okla.; **L. K. King,** foreman, Continental Oil Co., Sonora, Tex., to Altus, Okla.; **Clarence E. Long,** foreman, Cities Service Oil Co., Holdenville to Seminole, Okla.

Wayne V. Price, engineer, Southern California Gas Co., Los Angeles to Orange, Calif.; **William J. Wagner,** engineer, Shell Oil Co., Inc., Ventura to Bakersfield, Calif.; **Walter A. Tynes,** engineer, Sun Oil Co., Beaumont to Dallas, Tex.; **George Rial,** foreman, Sun Pipe Line Co., Premont, Tex., to Arabi, La.; **Paul S. Strain,** engineer, Standard Oil Co. (Ind.), Alton to Wood River, Ill.; **R. M. Brackbill,** engineer, Shell Oil Co., Inc., Oklahoma City to Perry, Okla.

DEATHS

Julius F. Roten, 59, vice president of L. Sonneborn Sons, Inc., and a pioneer in the development of petroleum chemical derivatives, died January 24 in New York. Roten, born in Zwingenburg, Germany, joined the company in 1905. He was an early sponsor of Pennsylvania motor oil as an automotive lubricant and was a founder and active member of the Oil Trade Association of New York.

Foster C. Spear, 53, of the chemical products division staff of Standard Oil Co. of New Jersey, died January 27 in Elizabeth, N. J. He had been with Standard for 27 years.

Fredrick S. Sealy, 52, Irving, Tex., East Texas division production superintendent for Humble Oil & Refining Co. from 1922 to 1936 and later an East Texas drilling contractor, died January 29 in Houston.

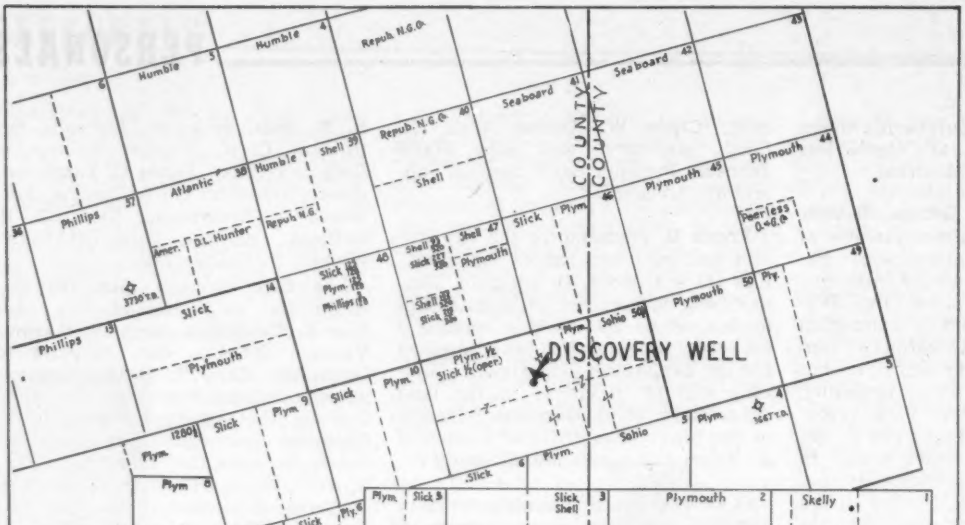
Milford Byron Packer, 86, pioneer Oklahoma driller and at one time driller for Madison Oil Co. of Pennsylvania, died January 31 in Bartlesville, Okla.

C. B. Gullette, district sales manager for Humble Oil & Refining Co., died January 25 in Houston.

Homer L. McGregor, former oil operator of Wichita Falls, Tex., died January 22 in California.

Edward C. Connor, Sr., 65, natural gas engineer and chairman of the State Examining Board of Engineers, died January 29 in Dallas.

Robert Irving Watson, 70, former chairman and managing director of Burma Oil Co., Ltd., died recently in London. He was also a director of Anglo-Iranian Oil Co., Ltd.



The 8,600-acre block, shared roughly 50-50 by Plymouth and Slick-Urschel, is interspersed with tracts held by other companies. A recent sale of several hundred acres north and west of discovery brought about $450 per acre. Brisk bidding is anticipated for the University Lands to the south, when they are offered for lease. This map, although recently corrected, may not show correct lease ownership of all tracts

by George Weber

Below: This is Iron Drilling Co.'s Buda-powered Emsco rig which completed the 12,020-ft. discovery

Benedum Field

1947's MOST IMPO

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...OST IMPORTANT DOMESTIC STRIKE?

Here is the first "on the spot" and detailed account of the Slick-Urschel and Plymouth prospective major pool opener in West Texas. The well has penetrated 1,000 ft. of Ellenburger pay (gross), with possibly 500 ft. yet undrilled.

THE new Benedum oil field of Upton County, West Texas, recently opened by completion of Slick-Urschel Oil Co. 1 Alford is an important development from a number of standpoints. Primarily, it indicates the discovery of a new oil and gas reserve of considerable magnitude. It may well prove the outstanding domestic strike, not only of 1947 but of the past several years.

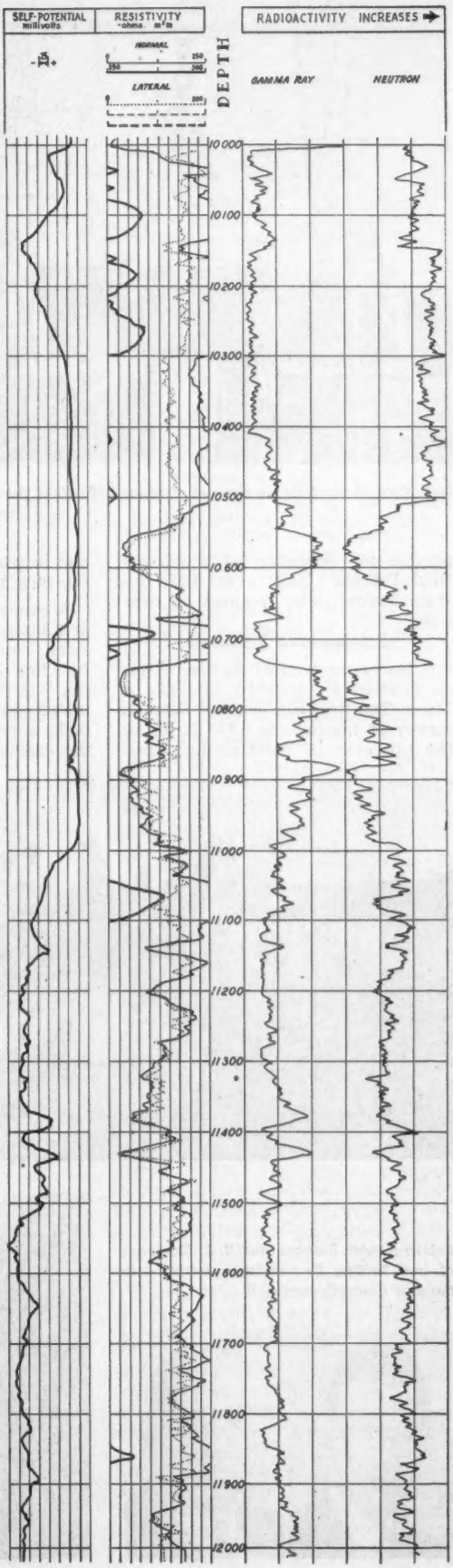
The discovery well chalks up two records. Flowing from perforations shot near the 12,000-ft. level, it is the deepest producer in West Texas and the deepest Ellenburger well anywhere. Further, it appears to have penetrated the thickest gross productive section of Ellenburger lime to date; roughly 1,000 ft. Character of production and geologic correlation with other Ellenburger wells of the region indicate that an additional 500 ft. of undrilled Ellenburger underlie the bottom of the hole. In addition, Pennsylvanian, Devonian, and Silurian sections indicate productive possibilities.

Penetrating relatively thick pre-Permian sections evidently high on structure, the deep Midland basin wildcat sharply directs geologists' attention to that region east of the Central Platform, and adds further credit to predictions that major reserves will be discovered along the general northwest - southeast trend paralleling present important production in the area. Finally, the well is of much interest to drilling engineers. A difficult operation successfully completed, it reflects the drilling progress of the past few years. Modern mud control and other improved techniques enabled the operator to carry a sidetracked 6⅛-in. hole through heaving shale and hard chert sections which defied penetration in 1941.

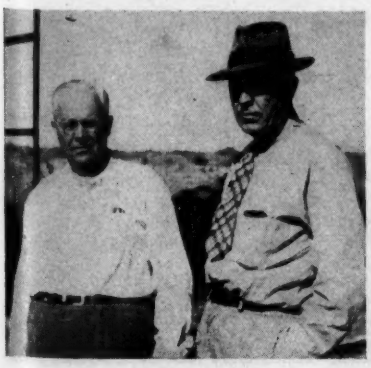
Background of Development

The anticlinal structure, located about 10 miles northwest of Big Lake, was indicated several years ago by geophysical exploration. Plymouth Oil Co., for whose president the field is named, originally assembled an 8,600-acre block on the prospect and drilled the 1 Alford to a total depth of 10,384 ft. Mechanical difficulties caused by heaving shale prevented the company from reaching the Ellenburger and the wildcat was temporarily abandoned in 1941. With 7-in. casing set to 9,748 ft., the test remained idle until 1947, when Fred Turner of Midland obtained a farmout from Plymouth. A half interest in the well and acreage immediately surrounding it, plus full interest in 4,000 acres in the block, was acquired in return for completing the well in the Ellenburger.

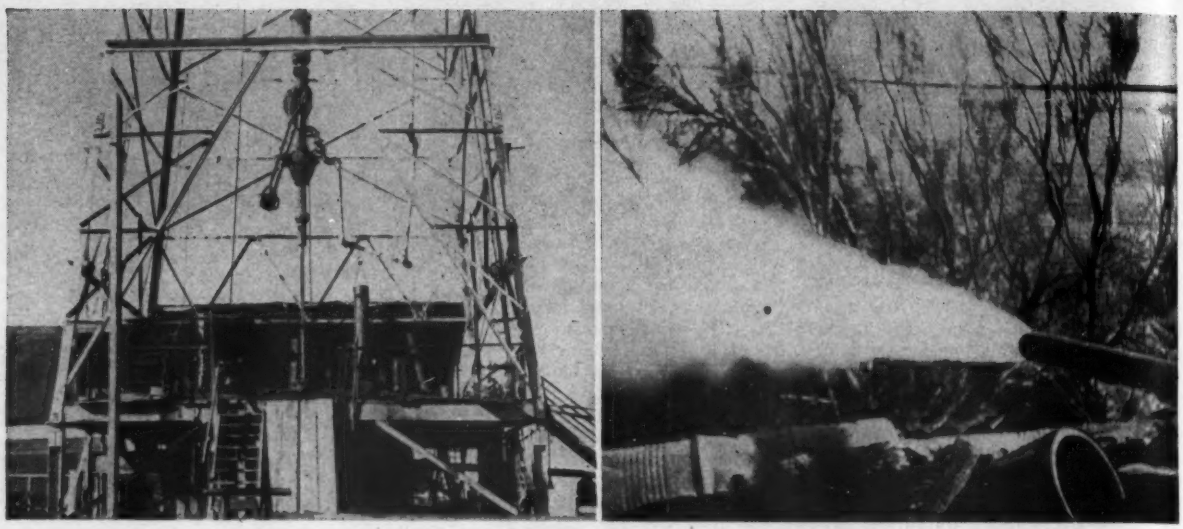
Slick - Urschel Oil Co. then became interested in the prospect. On obtaining the consent of Jim M. Hewgley, of Tulsa, to su-



J. M. Hewgley who supervised the important strike, with C. F. Urschel



Right: Schlumberger electrical log and Lane Wells radioactivity log of the Slick-Urschel Oil Co. 1 Alford, showing section from top of the Devonian to total depth in Ellenburger limestone. Further data concerning the electric log are: Mud density 10.9, viscosity 216, resistivity 1.06 at 78° F.; electrode spacings are AM 8 in., OA 32 in. LS. Data on the radioactivity log are: gamma-ray curve scale: —274 standard, 5.3 in. deflection from 12,009 to 9,400 ft.; neutron curve —275 standard, 4.0 in. deflection from 9,400 to 12,009 ft.



Left: View of rig floor as the last of some 1,000 ft. of productive Ellenburger section was being drilled. Right: Flowing to clean up the well for production tests

pervise the operation as a partner, Slick-Urschel took over the deal from Turner, who retained an override.

Sidetracking Successful

A heavy mechanical rig was moved on location by Iron Drilling Co. of Tulsa. The first step was an Eastman survey of the hole to 9,656 ft. to aid the operator in determining where and in what direction to sidetrack for the new hole.

A cement plug was set in the casing at 9,308-9,558 ft., then a casing whipstock, with the window at 8,252-38 ft. After drilling the window through the 7-in. casing, a Baker cement retainer was set at 8,457 ft. and 300 sacks of cement were pumped through the casing to seal off the formation. With the additional help of Homco service, the hole was drilled from the whipstock to 9,410 ft. with controlled direction at a maximum drift of 8° from vertical. From 9,410 to 10,000 ft. the hole was allowed to drift back to vertical.

Mud Control Important

Drilling was begun using 9-lb. mud. When the well started kicking at 9,428 ft., mud was weighted to an average of 10.6 lb. From that point, anticipating trouble, engineers with the aid of Rotary Engineering Co. services maintained careful, constant mud control. This measure is given much credit for successfully drilling and completing the well.

From 9,494 ft., mud weight was maintained at 10.6 to 11 lb. at total depth. Water loss was kept to 6 cc. or less at all times. Retaining low gel strength, the viscosity was raised

The great interest shown in the Slick-Urschel and Plymouth discovery is indicated by these two views of the many observers that crowded the location during the completion stages

Below: Herrick Babcock and H. L. Singletary of Iron Drilling Co., drilling contractor for the new Upton County well

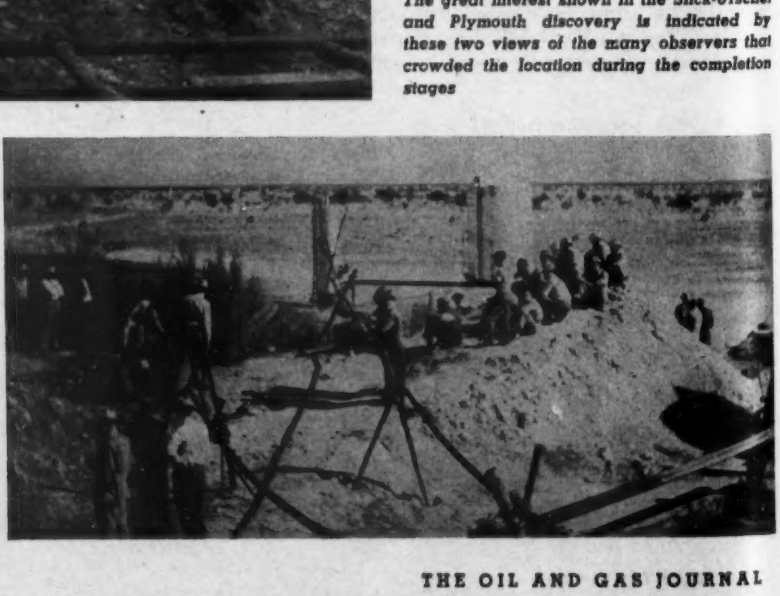


TABLE 1—DRILL-STEM TEST DATA

Test No.	Depth (ft.)	Time Hr.	Time Min.	Chokes (in.) Top	Chokes (in.) Btm.	Water cushion used (ft.)	Recovery	Remarks
1	9,410-94	4		1	⅝	1,500	Gas to surface in 15 min., max. w.p.* 0 psi. 4,860 ft. oil, estimated 40° gravity 1,260 ft. oil-cut mud 1,500 ft. water cushion	B.h.p. flowing 2,275 psi. B.h.p. shut in 2,950 psi. Pennsylvanian
2	11,030-96	4	50	1	⅝	1,000	Gas to surface in 3 hours, max. w.p. 0 psi. 1,000 ft. gas-cut w.c. 75 ft. gas-cut mud	Good blow gas B.h.p. not recorded Ellenburger
3	11,096-11,166	3	35	1	⅝	1,000	Gas to surface in 11 min., max. w.p. 60 psi. 1,350 ft. oily distillate 150 ft. gas and distillate-cut mud	Flowed w.c. in 27 min. Max. b.h.p. flowing 550 psi. Max. b.h.p. shut in 4,000 psi.
4	11,166-11,206	..	50	1	⅝	1,000	Gas to surface in 10 min., max. w.p. 600 psi. Gas flow rate, est. 10-15 M.M.c.f./day 360 ft. oily distillate, 53.8° gravity	Flowed w.c. in 11 min. Max. b.h.p. flowing 3,750 psi. Max. b.h.p. shut in, not recorded
5	11,206-56	..	32	1	⅝	1,000	Gas to surface in 8 min., w.p. 650 psi. Gas flow rate, est. 15-20 M.M.c.f./day 390 ft. oily distillate 5 ft. brackish water (?)	Flowed w.c. in 8 min. Max. b.h.p. flowing 4,000 psi. Max. b.h.p. shut in 4,950 psi.
6	11,276-11,312	..	54	1	⅝	1,000	Gas to surface in 20 min., max. w.p. 800 psi. Gas flow rate, est. 15-20 M.M.c.f./day 450 ft. oily distillate 5,700 ft. distillate-cut mud (packer fouled)	Flowed w.c. in 22 min. B.h.p.s not recorded
7	11,374-11,412	..	..	..	..	....	.....	Packer failed
8	11,356-11,412	3	..	1	⅝	1,000	1,000 ft. water cushion 1,350 ft. oily distillate-cut mud	Packer failed to set on first attempt B.h.p. flowing 1,700 psi. B.h.p. shut in, not recorded
9	11,415-96	3	30	1	⅝	1,000	Gas to surface in 30 min. 1,000 ft. w.c. 500 ft. oily distillate-cut mud	Max. b.h.p. flowing 550 psi. Max. b.h.p. shut in 3,200 psi.
10	11,507-88	6	15	1	⅝	1,000	Gas to surface in 18 min. 2,650 ft. oil and oil-cut mud 240 ft. oil-cut mud	Flowed w.c. in 3 hr. 45 min. B.h.p. flowing 900 psi. B.h.p. shut in, not recorded
11	11,587-11,684	5	45	1	⅝	1,000	Gas to surface in 18 min. 2,500 ft. oil, 52.8° gravity, cor. 2,550 ft. oil-cut mud 200 ft. salt water testing 76,800 p.p.m.	Flowed w.c. in 1 hr. 55 min. Flowed oil in 2 hr. 25 min. B.h.p. flowing 1,700 psi. B.h.p. shut in, not recorded.
12	11,676-11,722	..	..	..	..	....	.....	Packer failed
13	11,682-11,757	..	..	..	..	....	w.c. and drilling mud only	Good blow. Packer failed after 14 min. B.h.p. flowing 600 psi.
14	11,732-11,829	..	..	..	..	....	.....	Packer failed
15	11,831-70	1	5	1	⅝	2,000	.....	W.p. 0 psi. B.h.p. flowing 0-50 psi. B.h.p. shut in, not recorded.
16	11,908-72	1	5	1	⅝	2,000	Slight blow 280 ft. slightly gas-cut mud 2,000 ft. w.c.	

*w.p. = working pressure.

from 55 to an average of 160 seconds. Viscosity reached a maximum of 250 seconds at one point and tested 200 seconds at total depth. This mud maintained a filter cake of about 2/32 in. throughout the face of the open hole. The careful balance of mud characteristics was obtained by proper addition of Baroid, Aquagel, quebracho, and caustic soda. As a result, no trouble was encountered from heaving shale and loss of circulation offered no serious difficulty during drilling.

The entire drilling operation was marked with great caution, and the procedure and efficiency should be judged in the light of the pioneering done in carrying a small sidetracked hole to record productive depth in a relatively new area. A total of 125 rock bits was used in drilling the 3,500-ft. section from whipstock to total depth. Through Devonian-chert sections at 10,020-82 ft. and 10,300-10,530 ft. 26 bits were used. The reluctance to use worn bits is reflected by the fact that cones were lost in the hole only twice. About 18,000 lb. in drill collars was used in the string above the bit and rotary speed averaged about 50 r.p.m.

No coring was attempted. Drill-stem tests were passed up in several Devonian and Silurian sections which had excellent showings from cuttings, because of the primary concern in getting the hole into the Ellenburger. Subsequent tests in the field may be expected to reveal more information at relatively less cost per foot. Employing the same general mud program and drilling methods, the operator anticipates no serious drilling problems in developing the field.

The 16 drill-stem tests attempted, one in the Pennsylvanian and the remainder in the Ellenburger, are shown in detail in Table 1. It is interesting to note that the deepest section tested, which showed a slight blow, is included in two of the three sections perforated for completion. Cuttings indicated saturation through those sections tested in Nos. 14, 15 and 16.

At 12,020 ft., probably several hundred feet above the base of the Ellenburger, drilling was halted. A 12,018-ft. string of 5-in. o.d. extreme line pipe, all of that type of casing that was locally available at the time, was then run. While some mud loss was encountered on resumption of circulation through the casing, the string was successfully cemented on bottom with 100 sacks pumped through a Baker retainer set on bottom. Retainer and float guides were drilled out and a temperature survey showed the top of the cement plug in the annulus at 10,740 ft.

Casing was perforated at 11,885-10,910 ft. with 70 shots, at 11,945-60 ft. with 44 shots and at 11,975-85 ft. with 30 shots. After swabbing, the well was acidized with 1,500 gal. of 20 per cent acid at 3,500 psi. tubing pressure and 3,000 psi. casing pressure for 11 hours. The formation took acid at 4,100 psi. and pressure dropped to 2,100 psi. in 10 minutes. After pulling the swab three times, the well flowed, making an initial average of 53 bbl. per hour through

(Continued on page 81)

Stuffingboxless Pumps at Sinclair Station Designed for Operation Without Attendance

by Paul Reed

THE Dickinson, Tex., station installation of automatic stuffingboxless pumps was originally planned to solve problems peculiar to the 31-mile double 4-in. pipe line for special products from Texas City to the Sinclair Rubber, Inc., plant at Houston. However, certain advantages of these units indicate that they may represent a pioneer effort leading to a future widespread application in crude-oil and products pipe lining.

This Sinclair station is equipped with four Byron Jackson units. Three of these, with which this article is largely concerned, have been installed to operate in series for continuous delivery of butylene-mixture stocks pumped at 60° to 80° F. For handling 0.595 specific-gravity stock, capacity is rated at 7,200 bbl. daily; for 0.73 specific-gravity stock, 5,520 bbl. daily. The fourth unit is for pumping a variety of hydrocarbons as rerun stock from the Houston plant to Texas City.

John Wahlstrand of Byron Jackson Co.

All four of the Dickinson station vertical stuffingboxless units are installed underground—each in 16-in. casing, set in concrete. Since the units are entirely sealed they could be operated submerged by flood water, when wired with sealed electric conductors and when the electric control equipment would be installed at an elevation above flood water. The over-all length of each unit including controls is 16 ft. 5 in.

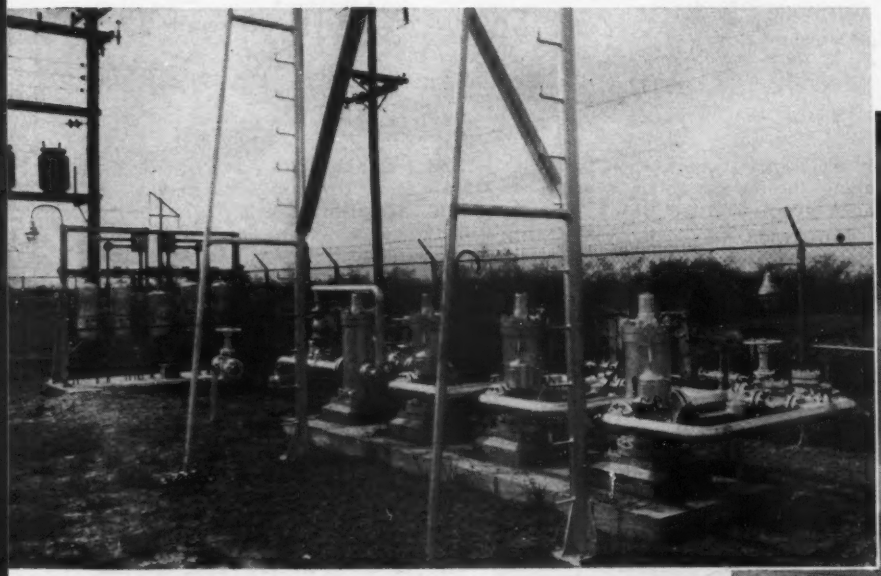
No Building at Station

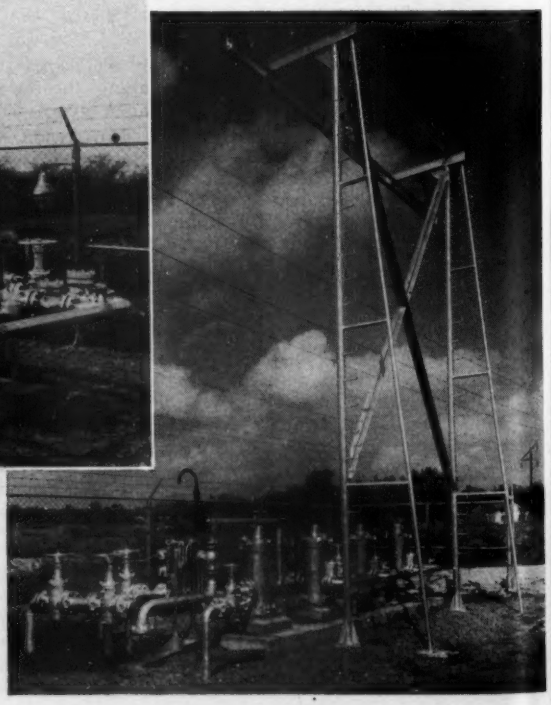
A trolley beam supported by A-frames alongside the installation facilitates the setting and removal of the pump units.

There is no building of any kind at the station. It should be mentioned that it would have been practicable to place all mechanical features except the trolley beam and signal-light equipment below ground in a concrete structure where nothing would be seen at the surface of the ground except manholes. This seems to be one important point for stuffingboxless pumps in future pipe lining, as suggested by the Dickinson station. One of the economic drawbacks in the development of completely automatic stations in the past 20 years has been the need for maintaining watchmen to safeguard equipment housed in a building on the surface of the ground. It happens that at Dickinson the local situation is such that the present type of installation with the upper part of the equipment aboveground is appropriate for safeguarding.

As the station is equipped at present, it is only necessary for an employe to pass by once or twice a day during operation to look at the red and amber signal lights indicating the status of the dielectric oil surrounding the electric motors. In driving by the station, the employ does not even need to stop his car, since the signal lights may be easily seen.

With a remote control system which the company considered, it would be possible for the dispatcher to





Above: Four stuffingboxless pumps at Sinclair Rubber, Inc., Dickinson, Tex., pump station. Right: Trolley beam on A-frames along pumps aids setting and removal of units

This article has been made possible by the cooperation of D. A. Young, manager, Sinclair Rubber, Inc. Information was obtained during a trip to the Dickinson station with D. E. Van Pelt, chief engineer, Sinclair Rubber, Inc., and from L. P. Chaney, electrical engineer of the company, as well as from W. N. Beadle, Norman Jesse, and

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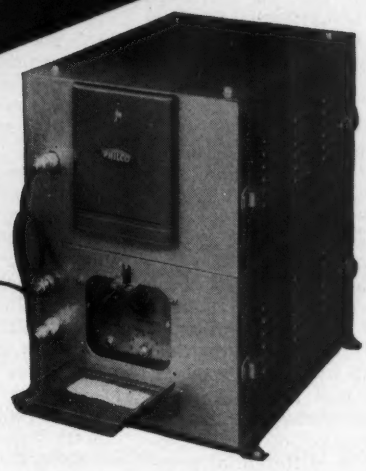

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observe the status of the dielectric oil in the pumps by signals communicated directly to an instrument board in his office. In this way daily observation by a field employe of the company could be eliminated.

Each of the units has a centrifugal pump with eight full stages for pumping products, and a small ninth impeller for maintaining a 20-lb. differential pressure on the dielectric oil. Each unit is driven by a 50 hp., 3-phase, 60-cycle, 440-volt, 3,550-r.p.m. induction motor with full load efficiency of 85 per cent; starting efficiency 70 per cent; starting current 600 per cent. Motors are equipped with internal thermostatic-type, self-resetting, overload relay.

Each pump unit has 28.3 hydraulic horsepower, efficiency 70 per cent; 40½ b.hp. Pump case is tested for 1,350 psi. At the suction connection there is a 4-in., 600-psi. ring joint; at the discharge, a 3-in., 600-psi. ring joint. There are check valves between pumps.

Station test data show suction pressure as 213 psi.; suction pressure developed at second unit 453 psi.; third unit stage 693 psi.; discharge pressure of the three-stage installation, 950 psi.

Distinctive Feature

The distinctive feature of these stuffingboxless pumps is the provision for a motor or dielectric oil (of a transformer type for insulating and cooling) in which the electric motor is immersed. Part of the dielectric oil fills the inside of a Neoprene bellows built in the head of the pump unit. The bellows itself is surrounded by the pumped liquid at a pressure of approximately 20 psi. greater than that of the pump suction.

This provides that any leakage at the seal will be outward, insuring against contamination of the dielectric oil. This 20-lb. differential pressure is maintained by the special small impeller previously mentioned.

In the event of leakage of dielectric oil, the Neoprene bellows dilectric oil reservoir will rise, floating upward as it becomes lightened; therby it replaces oil lost by leakage in the electric motor. If oil is lost to the extent that there is danger to motor operation, the Neoprene bellows actuates an iron pin or tube which attracts an Alnickel magnet; this opens a switch which darkens an amber warning light. If the magnetic core rises further, it attracts a second Alnickel magnet which opens a control switch, thus stopping the motor and turning off a red light.

Three 75-kva. 12,000/440-volt single-phase transformers supply 3-phase power to the station. Between the meter and the main 440-volt circuit breaker there is a connection through a fused switch to a 5-kva. 440/110-220-volt transformer supplying lights and all control circuits.

Each motor circuit breaker is equipped with a similar auxiliary mercury switch to prevent premature starting by closing when the control circuit is holding the motor starter closed.

The amber signal light is lit when all control switches are closed and only Mercoid pressure switches and the push-button station may be keeping the motor from starting. The red signal light indicates that the motor is running. Units are equipped with Mercoid suction and discharge pressure controls. The push-button station for each motor is above the suction pressure Mercoid.

Main circuit breaker and controllers, control switches, and Mercoids are weather and explosion-proof.

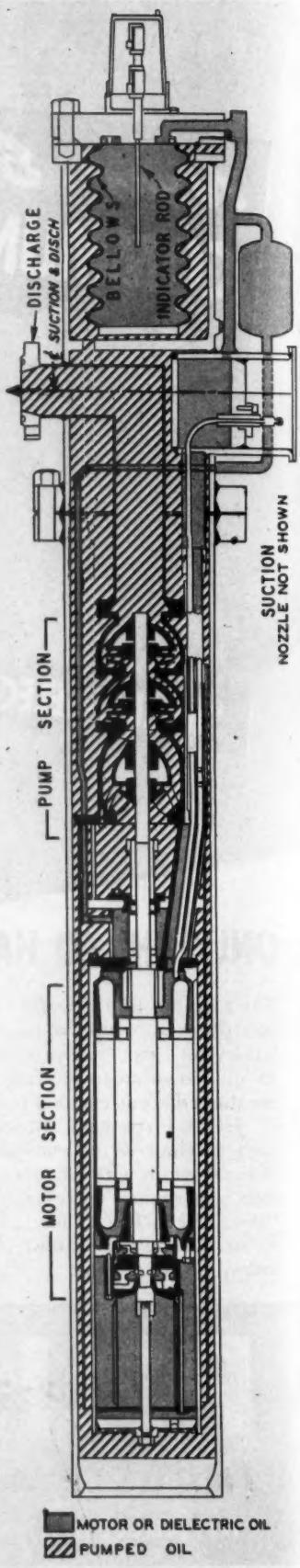
With the elimination of the stuffingbox, loss of liquid to the atmosphere is entirely prevented. Being totally inclosed it is fireproof and foolproof and needs no attendance or supervision. No pressure above vapor pressure is required for flooded suction. The station is entirely explosion-proof and weatherproof and no protection against storms and heavy rains is required. No building or housing is necessary. These features, together with flexibility of operation, give certain advantages which offset higher first cost to give economical over-all cost for certain future applications in crude-oil and products pipe lining.

So far most of the pipe-line applications of stuffingboxless pumps have been for moving products from storage tanks to pump stations. The Dickinson installation is the first for a pipe line of any considerable length.

Byron Jackson Co. is prepared to build stuffingboxless pumps driven by motors up to 350 hp. and a design program is being pushed rapidly to prepare for all types of such pumps for crude-oil-products pipe lines.

With remote control and no need for shelter or attendance, such units may be placed advantageously on some projects at isolated locations. Individual units may be placed at various points to meet hydraulic requirements. In fact, several units could be distributed along certain pipeline systems since it would not be necessary to concentrate pumping equipment at station locations in order to facilitate operation and maintenance procedures. The units could be operated by the dispatcher and serviced by traveling maintenance men who in the future may be making their rounds in helicopters.

Now that it is commonly recognized that equipment acquires additional value at the rate of approximately $10,000 per man eliminated through its use, it appears that in many instances the higher first cost of stuffingboxless pumps will be warranted.



Right: Design features of stuffingboxless pumps installed at Dickinson station. Both motor and pump operate within a heavy steel cylinder

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Heavy concentration of wells in Long Beach Harbor, California, showing directional drilling from inaccessible locations

↓ "WHERE" *Directional Drilling* "HOW" →

DIRECTIONAL drilling, employed in many of the world oil areas, probably has been carried on its widest and nearly 100 per cent scale in Huntington Beach and Long Beach Harbor fields. There are some 125 wells in Huntington Beach which are all producing from far out under the ocean bed, and have produced over 25 million barrels to date. Many of them are bottomed in excess of 3,000 ft. from shore and carry drift angles of 60° from the vertical.

Long Beach Harbor-Wilmington field has an estimated 750 deflected wells which are bottomed under the Long Beach downtown business area, under factories, shipyards, bays, harbors, docks, and warehouses. In time the entire area will be adequately and scientifically drained. Wells are deflected up to distances of 4,000 ft. from the surface locations although the average deflection is much less than that in Huntington Beach field. Surface equipment, in all cases, does not interfere with normal business or expansion since the least valuable land can be used.

In the Ventura area, several smaller directional drilling programs are in progress in this rugged, hilly territory. Operators have found it more economical to establish a few centralized "drilling islands" and drill a spread of wells directionally therefrom rather than to grade all surface locations and maintain roads to individual rig sites.

Used in Many Areas

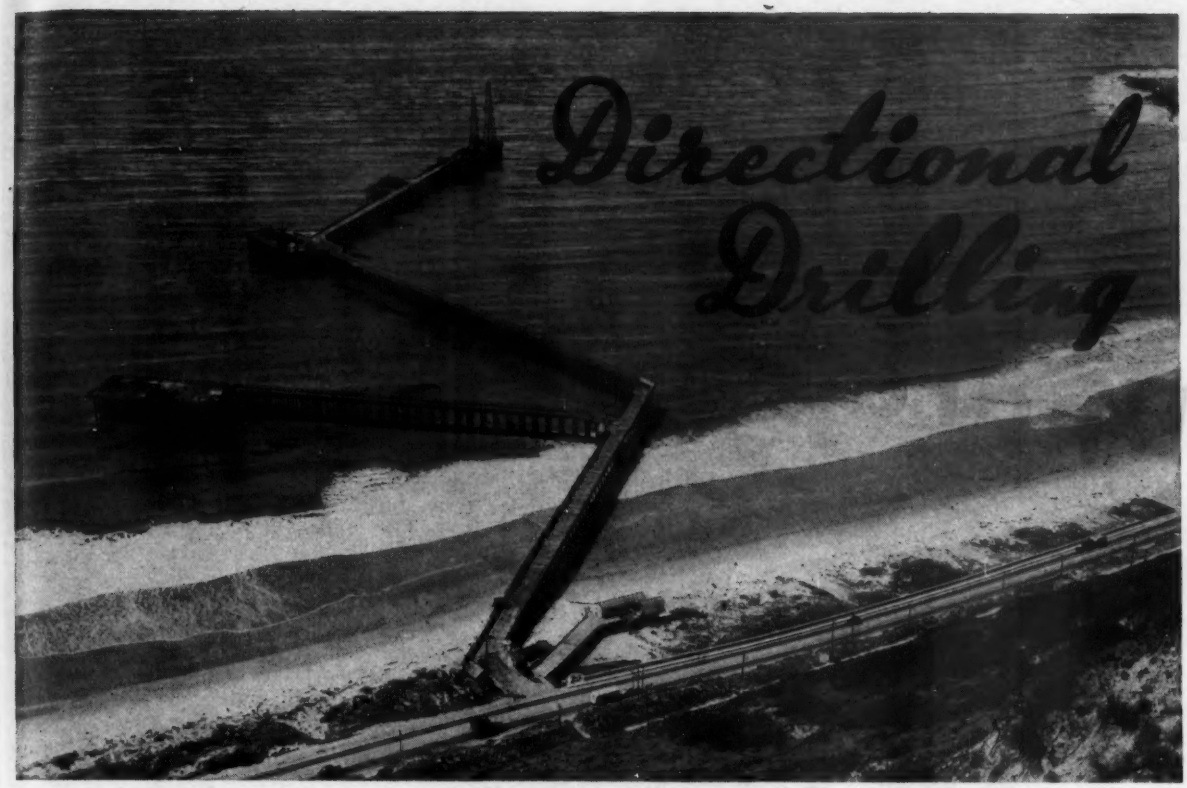
Two small projects are now in progress in deflecting for production under residential property which is zoned against the actual drilling. Many more such programs are contemplated, some of them quite extensive. There is a good possibility that many home owners, living in fully developed residential districts, may enter in community leases and enjoy all the advantages of oil-productive leases without the disadvantage of having unsightly oil derricks and surface equipment intermingled among the homes.

Brochures on certain community leases indicate that all surface equipment will be placed underground, and then landscaped to give a park-like appearance.

The shortage of the discovery of new oil structures in southern California, together with the great increase in residential and business development indicate that directional drilling will be used more and more extensively. Ten years ago only 5 per cent of the wells in California were directionally drilled. Today the percentage runs between 15 and 20 per cent. Ten years ago, no drilling contractor would touch a directional hole except on a day-work basis. Today these same contractors eagerly bid turnkey directional jobs.

This paper was recently presented before the Southern California Meter Association. The author subsequently augmented the material for publication in The Oil and Gas Journal.

Directional Drilling



Aerial view of pier construction from which a directional-drilling program has been carried out. Rincon, California, area

by Vernon Shepherd*

CONTROLLED directional drilling is the art of causing a well bore to deviate from the vertical along a predetermined course. The deviation may be from a few feet to several thousand feet and the inclination of the bore hole from the vertical may be as much as 65° or more.

Controlled directional drilling has been and is successfully used for:

1. Drilling beneath lakes, rivers, swamps, or other water bodies, from shore, or from natural or man-made islands.

2. Drilling beneath areas of severe topography from more suitable adjacent locations.

3. Drilling beneath areas of highly improved surface development, from alongside thereof.

4. Exploitation of salt-dome structures, particularly those complicated by overhanging salt lips.

5. Exploitation of areas complicatd by faulting or abrupt changes in dip.

6. Increasing the exposure of the reservoir rock to well-casing perforations by causing the well bore to intersect the reservoir bed at a flat angle.

7. Geological exploration, wherein several well bores, radiating from a common location, are drilled.

8. Recompletion of producing wells through deflection of the well bore away from its previous location in the producing horizon.

9. Sidetracking of lost tools by drilling past them in a deflected hole.

Four prerequisites are necessary for directionally drilling a well: (1) A convenient survey instrument which will be used to determine progress along the predetermined course. (2) A removable deflection tool which will cause the bore hole to follow its predetermined course. (3) A means of orienting or facing the deflection tool as desired. (4) That human factor of "know-how" or supervision, which utilizes the available tools, conventional drilling equipment, and practices, to gain the desired end result.

A single-shot instrument is a "must" in directional drilling since it is absolutely necessary to have an up-to-the-minute survey of the bore hole as drilling progresses. As its name implies, the single-shot takes a single survey record on each run into the bore hole. A single shot is an especially made camera which is run into the bore hole on a wire line. It is contained in a nonmagnetic watertight barrel or tube. It carries batteries to supply the necessary light source, light bulbs and lens, and a special watch which acts as a timing device in making the photographic exposure.

The surveying element consists of a plumb bob which records the in-

Eastman removable whipstock in position to be run into hole. Member of well crew holds "single shot" survey instrument, with which a reading has just been taken of the well's deflection and direction

*Engineer, Eastman Oil Well Survey Co.

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Pumping units on directional wells at Huntington Beach. Pacific Ocean is to the left

clination from the vertical and a compass card and needle which is acted upon by the magnetic pole. A sensitized paper disk, inserted into the single-shot instrument just prior to its run into the bore hole, records the positions of the plumb bob and the compass card after they have come to rest at the desired depth in the bore hole. This sensitized paper disk is developed at the rig and the record is available a few miniutes after the instrument has been withdrawn from the hole.

Single-shot instruments are available in a regular and a small size. Drilling practice requires these since there are various methods by which single-shot records may be obtained. The original practice was to run a regular single shot in open hole after the drill pipe had been withdrawn from the bore hole. The regular single shot is run on the bottom of a joint or two of 2½-in. tubing to furnish sinker-bar weight and to provide length for alignment with the bore hole.

Reducing Round Trips

Desire for fewer round trips of the drill pipe, for survey reasons only, caused the introduction of wire-line coring equipment, tripper bits, and monel or nonmagnetic drill collars. The single shot, to provide an accurate record, must be used in such a manner that the compass will not be influenced by the magnetic attraction of the drill string. Single shots taken after the drill pipe is out of the hole meet this condition. The wire-line coring equipment and the trigger bit allow the single-shot barrel and instrument to protrude out through a special opening in the bit and to be beyond the influence of the magnetic attraction of the drill string. The monel or nonmagnetic collars are utilized in such a manner that the compass in the instrument is automatically stopped near the middle of the length of the collar thus being isolated from the magnetic influence of the drill string.

Usually it is necessary to use the small single-shot when surveying in or through the drill pipe because of the inner-bore restrictions. Survey records on a directional well are usually taken at approximately 60-ft. intervals, thus where the formations are sufficiently soft to allow a bit to make considerable footage, the use of inside surveying is instrumental in greatly speeding up the progress of the drilling. Single-shot instruments are placed on the rig on a nominal rental basis and are operated by the regular drilling crew. They provide information whereby the progress of the deflection of the bore hole can be plotted up to the minute. They serve as the eyes of the directional driller.

Except in certain cases of redrills, all deflection tools are set in open hole. There are several time-tested deflection tools in current use, all being of the removable type. Most are of the rat-hole type, that is, the initial deflection hole is of reduced size.

The removable whipstock was the first to be developed and more of these have been set than all other deflection tools combined. Basically it has not been changed since its introduction, though a number of modifications have made it safer and more effective in operation. The removable whipstock has a concave channel down the face that tapers from the inside of a collar at the top to the periphery at the bottom. The lower extremity is a chisel spade parallel to the face of the tool. A shear bolt is screwed into the bit to hold the whipstock in a fixed relationship with the drill pipe until accurately located on the bottom of the bore hole. The larger-size whipstocks are cast with ribs or grooves on the back to reduce weight. These also help to maintain direction and facilitate their running and removal in tight holes.

Whipstocks are adaptable to both rock and drag-type bits. The size of the whipstock varies with the size of the bore hole, usually being from 1 to 2 in. smaller than the hole into which they are run. Drill pipe rather than drill collars is used directly above the whipstock bit in order to obtain the necessary flexibility required by the wedging action of the whipstock on the bit.

The preparation and operation of removable whipstocks are simple. The drill pipe is lowered through the ring at the top of the whipstock, the bit is screwed on, and the drill pipe is pulled up to engage the bit in the collar where the shear bolt is inserted to fasten securely the whipstock to the bit and drill pipe. The bit is larger in diameter than the collar, hence will not pass through it. This feature makes the whipstock removable when the run is completed, since, when the drill pipe is withdrawn from the bore hole, the whipstock will be lifted by the bit engaging into the collar.

The whipstock is oriented into the hole and faced in the desired direction. Weight is applied to force the chisel into the bottom of the hole and then additional weight is applied to break the shear bolt, freeing the bit, thus allowing the drill string to be rotatable. Drilling proceeds with slow rotation and light weight, until the bit us just below the bottom of the whipstock. Drilling continues for an additional 10 or 15 ft., but with added weight. The drill pipe is then carefully elevated until the bit is engaged in the collar at the top of the whipstock. Since the bit will not pass through the ring, the whipstock is lifted off bottom and the drill string is removed in the normal manner.

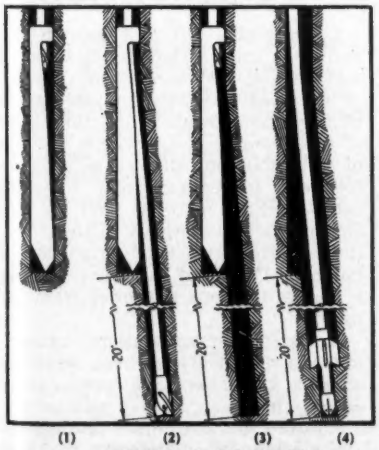
The whipstock is taken off the drill pipe at the surface by merely removing the bit.

Followup procedure depends upon the problem in hand. In some cases additional rat hole is drilled on flexible drill pipe, though most frequently the hole is reamed to gage and normal directional-drilling practices are pursued.

Knuckle Joint

Another commonly used deflection tool is the knuckle joint. It is a universal ball-jointed tool which holds a short drill collar and rat-hole bit at an angle to the drill string by means of a spring-actuated cam. Circulation is carried through the ball-and-socket joint to the bit and the entire tool is rotated. It depends on weight to hold it in orientation at the start of the drilling by wedging the short drill collar across the diameter of the bore hole. It is most suitable in drag-bit-type digging and is especially adaptable for running into holes where the lower portion has been scraped. The spring-actuated cam allows the drill collar to straighten out while passing through the restricted portion of the bore hole and then causes it to assume its normal angle when the enlarged section is reached. Drilling commences at the bottom of the original hole thus leaving a minimum of shoulder. Knuckle joints are supplied in three sizes which will meet the requirements for most bore holes.

A third deflection tool is the spudding bit. As its name implies, the tool is not rotated but is spudded by raising and lowering the drill string. It is especially adaptable to the softer formations. The spudding bit has a curved bottom or heel and is somewhat shovel-like in appearance. The water course is directed to the forward edge on the upper side of the bit. The cutting edge, which is offset, is sharp, penetrating the formation by force of the weight of the drill pipe and by hydraulic action. Spudding continues until some 6 in. to 2 ft. of hole has been spudded on the proper side of the bore hole. The drill pipe is then withdrawn and a rat-hole follow-up bit is run on limber pipe. The bit drops into the spudded pocket, weight is applied forcing the drill pipe to bend across to the other side of the hole, and some 10 to 20 ft. of rat hole is drilled. The hole is then reamed to gage.



—OPERATION OF THE WHIPSTOCK
1—On bottom in the oriented position. 2—Pilot hole made. 3—Picking up the whipstock. 4—Reaming pilot hole to full gauge.

The spudding bit has proved very effective when run in conjunction with removable whipstocks and knuckle joints. This is especially true when sidetracking cement plugs. The spudding bit nest provides a pocket for the lower end of the whipstock to set in, and, facing the latter in the same azimuth in which the spudding bit was oriented, forces the whipstock bit into contact sooner with the formation. The whipstock body positions itself somewhat diagonally across the original bore hole.

The knuckle guide, a combination of the whipstock and the knuckle joint, has been used locally with considerable success. The guide portion which is in fact a whipstock, carries a somewhat deeper channel in its face. A ball-and-socket universal joint is used immediately above the bit and short drill collar, and all are contained in the concave while running into the hole. The tool is removed at the completion of the run by the use of the conventional ring at the top of the guide or whipstock. The drilling assembly has the same features and functions in the same manner as the bit on the removable whipstock; that is, it will not pass through the ring.

Knuckle joints, removable whipstocks, and knuckle guides are all available as full-gage tools. That is to say, they do not drill a rat hole. Their use is not too widespread since their advantage is slight. The bodies of the full-gage guide and whipstock fill the bore hole considerably closer than the rat-hole type, hence the full-gage variety fails to get to the bottom far more frequently than the rat-hole tools.

Orientation Methods

Two methods of orientation of deflection tools are available, namely, surface or bottom hole. The former requires the use of clamps and sighting instruments and utilizes only that portion of the drill string which protrudes above the mouth of the bore hole. The bottom-hole method requires special survey instruments, similar in design to small single shots. The surface orientation system is most widely used, and there are two variations. The projected vertical plane orientation method is simple and fast, requiring the minimum of computation. The tool is aligned on the surface in the desired azimuth at which it is to be faced on the bottom of the bore hole. An orienting clamp, containing an adjustable sight socket, is set on the drill pipe and a sighting bar placed in the clamp and adjusted to a fixed distant reference point.

Another clamp is affixed at the top of the stand of the drill pipe on which the deflection tool is suspended. A derrick sighting telescope is inserted into the upper clamp and the adjusting screw on the movable sight socket is turned until the cross hair of the telescope is parallel with the sighting bar below. The sighting bar and telescope are taken out of the clamps, the lower clamp is removed, and the drill pipe is lowered. After another stand is set on and made up, the sighting bar is placed into the lower clamp. Another clamp is affixed at the top of the stand in the derrick. The telescope is inserted and adjusted to align the cross hair to the sighting bar below.

This procedure is repeated on each stand and thus keeps a vertical projected plane on the drill pipe until it reaches bottom. When the last orienting clamp comes down to the rotary table, the sighting bar is inserted into the clamp and the drill pipe is turned until the bar is aligned on the distant fixed reference point. This faces the tool in the original azimuth as used on the surface.

The algebraic summation of angles of rotation requires similar orienting clamps. The survey derrick man uses a telescope which sights horizontally while the survey floor man uses a special transit. The tool is faced in the desired azimuth on the surface. The derrick man aligns his clamp on a previously chosen sighting point at some distance from the rig. He sights all clamps on this point. The floor man measures the angles of rotation of each stand with his floor transit by resighting back to the derrick man's reference point. The total of the turns determines the azimuth of the tool at bottom.

Bottom-Hole Methods of Orientation

The bottom-hole method of orientation is the most recent development. It is especially adaptable in deep holes where torque might be encountered. No clamps or surface measurement are required as the drill pipe and deflection tool are run into the hole. It is necessary, however, that the bore hole have a slight drift angle from the vertical at bottom. A minimum of 2° is required, and a survey picture is taken at that depth prior to running the deflection tool.

A pair of strong magnets, having a known reference azimuth to the face of the tool, is carried in a sub just above the deflection tool. The drill string is run into the bore hole until only the kelly connection remains to be made. A special single shot is run inside the drill pipe and automatically stops with the magnetic element or compass level with, or opposite, the magnets. The magnets substitute for the polar attraction, and the plumb

(Continued on page 84)

PETROLEUM ENGINEERING SCHOOLS

NO. 12 IN A SERIES

OHIO STATE UNIVERSITY

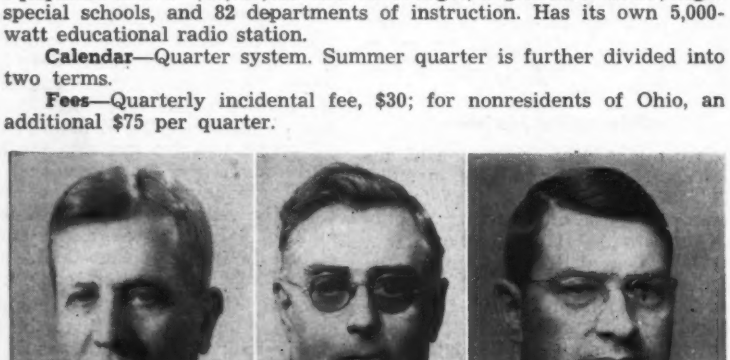
The engineering quadrangle at Ohio State University is shown above. Lord Hall, in which petroleum engineering is taught, is the diagonally placed building at the right center of the aerial view

SALIENT FACTS AND FIGURES

General—State, land-grant university, coeducational, controlled by a board of seven trustees. Founded in 1870. Dr. Howard L. Bevis is president. Campus is located within the city of Columbus. University has 1,800 acres of land, with 417 acres in campus, 383 in an airport, and 1,000 in the university farms. Total value of land, buildings, and equipment is over $30,000,000. Has 10 colleges, a graduate school, eight special schools, and 82 departments of instruction. Has its own 5,000-watt educational radio station.

Calendar—Quarter system. Summer quarter is further divided into two terms.

Fees—Quarterly incidental fee, $30; for nonresidents of Ohio, an additional $75 per quarter.



CHARLES E. MACQUIGG *HAROLD E. NOLD* *EDWARD V. O'ROURKE*

TOTAL fall-quarter enrollment in the current academic year at Ohio State University in Columbus was 25,400, and of this number 4,100 were enrolled in the college of engineering. Enrollment in the mining department last fall numbered 15 freshmen, 16 sophomores, 13 juniors and 4 seniors. About two-thirds of the students in the last three classes are majoring in petroleum production engineering.

Engineering Follows 5-Year Program

In the fall of 1945, a 5-year program began at O.S.U. for all engineering students. Under this program there is a considerable amount of work to be taken in departments outside the college of engineering—courses such as sociology, psychology, history, economics, and languages. Those students who have a general scholastic average of 2.75 and an equal average in their major work are eligible to enroll in the graduate school at the beginning of their fourth year; if they meet the requirements of the graduate school in the fourth and fifth years, they receive both a bachelor's and a master's degree. Those not qualifying under this arrangement receive the bachelor's degree at the end of 5 years.

Courses in petroleum engineering were offered at O.S.U. as early as 1925. Some of the first graduates are now chief engineers of producing oil and gas companies. Others have attained fairly high executive positions; but the number of graduates always has been small.

30 Miles From Oil Fields

Considerable oil and gas drilling activities are carried on in Ohio. In fact, during 1947 it was the only one of the eastern states to increase its Pennsylvania Grade production. Some of these activities are within 30 miles of Columbus and provide a place for frequent inspection trips to study cable-drilling methods and oil and gas-production methods. Water flooding of oil has become important in northern Ohio and the scene of these activities is about 120 miles from Columbus.

In petroleum production engineering, the school offers three recitation courses, one laboratory course, and a design course consisting primarily of laboratory work. Courses in electrical and mechanical engineering are taken in the respective departments, and hydraulics is given under the depart-

ment of mechanics. Some of the mining courses cover drilling and cementing methods and explosives. It is intended, under the 5-year program, to make the master's program of the petroleum option under mine engineering much more scientific than it has been. Physical and organic chemistry have been added to the curriculum and some heretofore required mining courses will be made optional.

The engineering experiment station, also located on the campus, is conducting a rather large project in the way of a grading laboratory for crude oils, and the station also plans to do research work in production methods. This work is under T. H. Kerr, a former official of Ohio Fuel Gas Co. The American Petroleum Institute has had a project at the university for some 10 years involving the production of synthetic hydrocarbons. This work is under Prof. Cecil E. Boord of the chemistry department.

Charles E. MacQuigg is dean of the college of engineering; Harry E. Nold is chairman of the department of mine engineering; and the instructional work in petroleum engineering is given by Edward V. O'Rourke.

Students are required to spend at least one summer in industrial work. They also are required to take a 10-day inspection trip at the end of their third or fourth year. The petroleum inspection trips usually have been taken to Michigan or Illinois and in Ohio.

In addition to the students majoring in petroleum engineering, some students in geology and mechanical engineering usually take petroleum work. In this respect, the mining department functions somewhat as a service department in addition to providing work for its major students.

Starting salaries for graduates with a bachelor's degree average $275 per month. Graduates of the college of engineering have the advantages of a college placement service which maintains contacts with leading employers of engineering graduates in Ohio and throughout the United States.

A fellowship was established recently in the department by Shell Oil Co., Inc., and Joseph C. Vaughn of Carey, Ohio, was appointed under this fellowship, effective January 1.

Honorary fraternities on the campus include Tau Beta Pi (general engineering honorary); Sigma Gamma Epsilon (geology, mining and metallurgy); Theta Tau (general engineering profession); and Sigma Xi (scientific honor society).

BOOKS

A.S.T.M. STANDARDS ON PETROLEUM PRODUCTS AND LUBRICANTS (WITH RELATED INFORMATION). Prepared by A.S.T.M. Committee D-2 on Petroleum Products and Lubricants. 690 pp. $4.75 in paper, $5.40 in cloth binding.

The greatly expanded 1947 volume contains more than 130 test methods, specifications, and definitions. While the standards are arranged according to the sequence of their numeric designations, there is a detailed table of contents listing the standards according to the general fields covered, and also a subject index. There are a number of tests and specifications for motor and aviation fuels and another large group pertains to diesel and burner fuels, kerosine, and illuminating oils. Also covered are plant spray oils and petroleum sulfonates, and asphaltic materials, with several specifications and numerous tests.

1948 PETROLEUM DIRECTORY. Published by J. J. Barkley, 324 Esperson Building, Houston. 400 pp. $15.

The 30,000 listings in this directory are said to include all petroleum producers and associated personnel in the central oil states. The 18 states of the Gulf, Mid-Continent, and Rocky Mountain areas are covered. All names are listed twice—by geographical location and in an alphabetical roster. An additional section includes attorneys and abstractors throughout the area.

THE PENNSYLVANIA GRADE CRUDE OIL ASSOCIATION—ITS AIMS, FUNCTIONS, AND RECORD. Published by the association, Bradford, Pa.

This pocket-size booklet is published to answer the questions most frequently asked about the association. The original edition, published in 1939, furnished answers which were assembled primarily in order to submit data to the United States Department of Commerce. Meanwhile, the associations activities have been expanding, and the purpose of this new edition is to present a picture of current functions and goals of the association.

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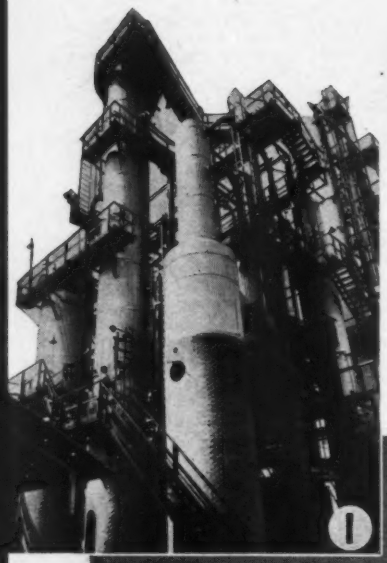
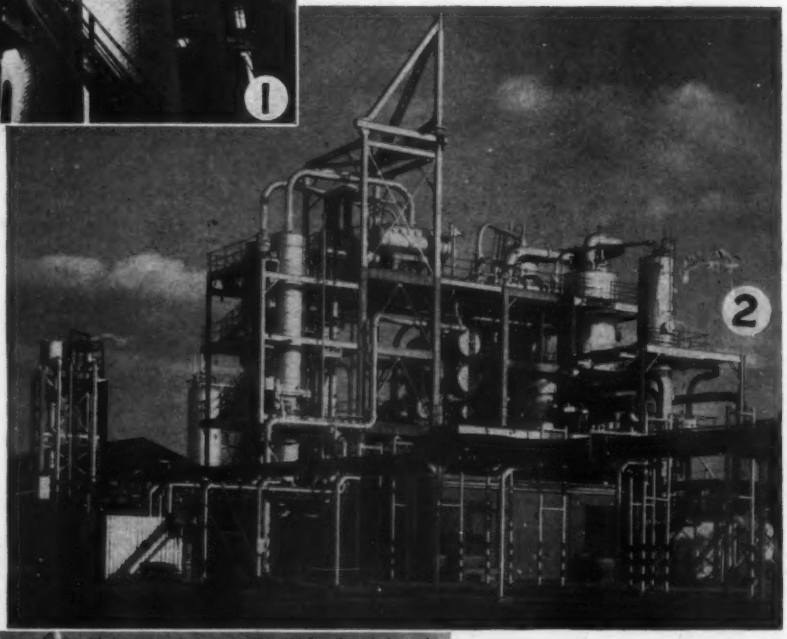


U.S. Lube Oil Capacity

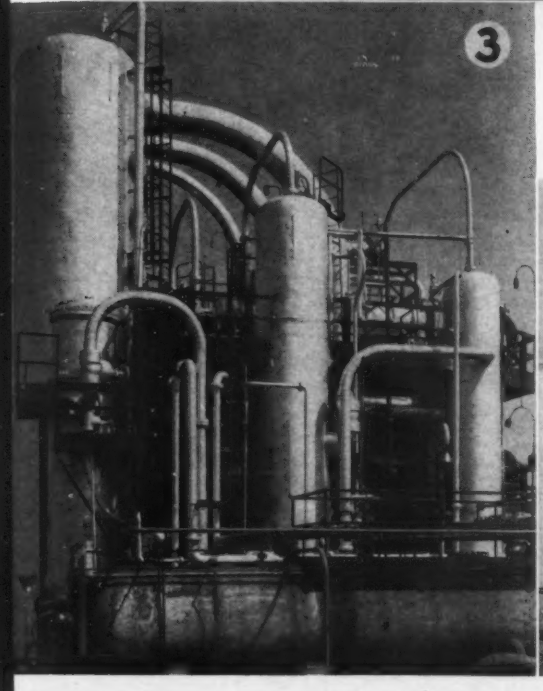
AS SURVEYED BY THE OIL AND GAS JOURNAL; MANY NEW UNITS NOW UNDER CONSTRUCTION

by Arch L. Foster

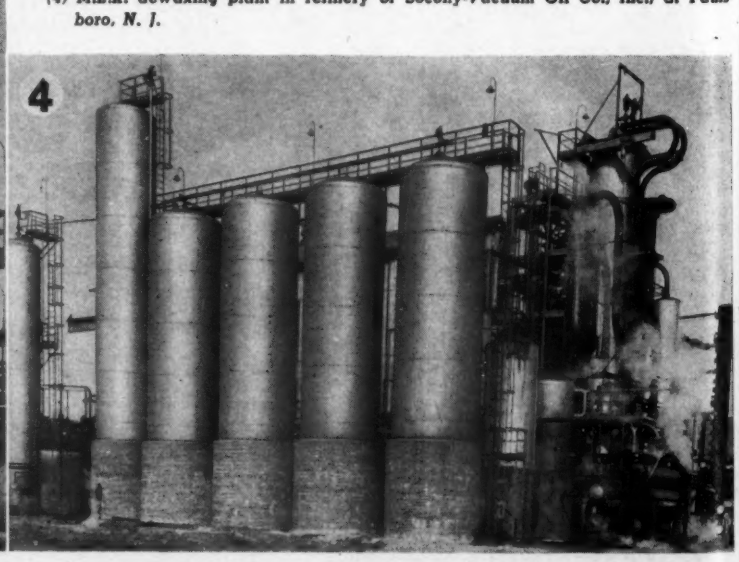


RESULTS of a company-to-company survey of lubricating-oil-plant capacities just completed by The Oil and Gas Journal show the United States refining industry to be operating or building adequate capacity for the manufacture of all lubricating-oil requirements for 1948-1950. Caught short in its capacity for the refining of top-grade "heavy duty" lubricants at the beginning of World War II, the national capacity has been expanded rapidly, much of it during the war. Now the total capacity for finished lubricating oils of all types appears to be approximately 150,000 bbl. per day. These results are tabulated from individual reports received from the refineries of the industry and are believed to be complete.

Referring to Table 1, a compilation of individual returns from all lubricating-oil refineries in the United States, certain companies report 65,420 bbl. per day as charging capacity. The remaining refiners report on the basis of finished oil capacity, and which totaled 94,919 bl. per cal-



(1) Furfural solvent-extraction unit installed at Port Arthur, Tex., refinery of The Texas Co.
(2) Duo-Sol unit of Socony-Vacuum Oil, Inc., at Paulsboro, N. J.
(3) Duo-Sol plant at Shell Oil Co., Inc., Wood River, Ill., refinery
(4) M.E.K. dewaxing plant in refinery of Socony-Vacuum Oil Co., Inc., at Paulsboro, N. J.



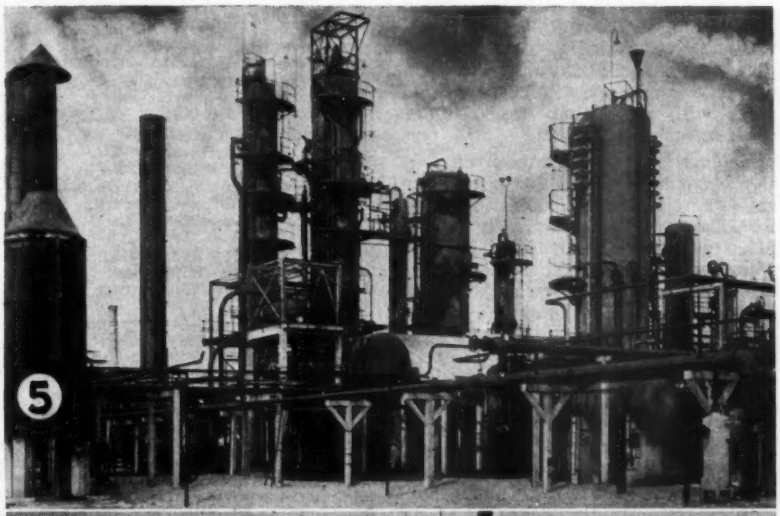
endar day. Assuming an 80 per cent yield from the figures on charge capacity, the total of the two figures amounts to the 150,000 bbl. previously mentioned. This value, of course, will vary with the method of operation of each unit included in the report.

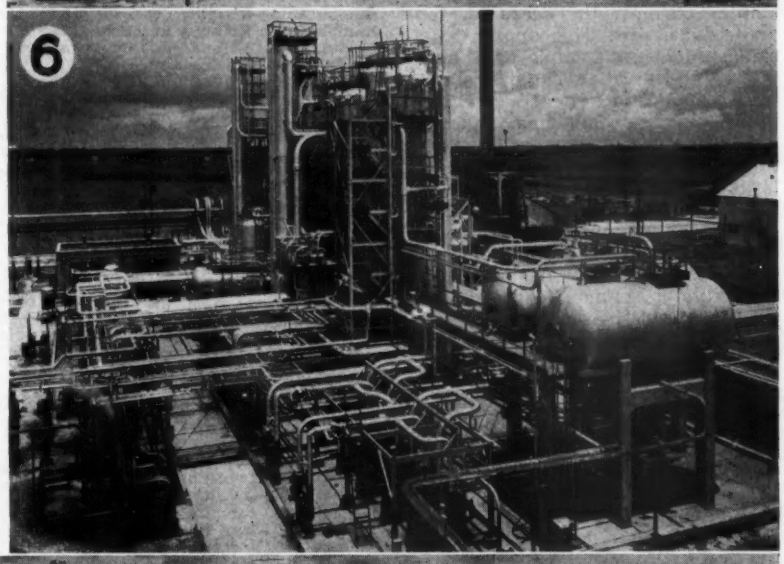
The table also shows the various solvent-extraction and solvent-dewaxing units installed by the different companies, although the reports did not include in all cases the charge or finished oil capacity of these solvent units. About 26,000 bbl. per day of oil capacity does not include solvent units of any sort. This is about 15 per cent of the total lubricating-oil capacity and the greater portion of it is concentrated in the Pennsylvania area, among the smaller refineries.

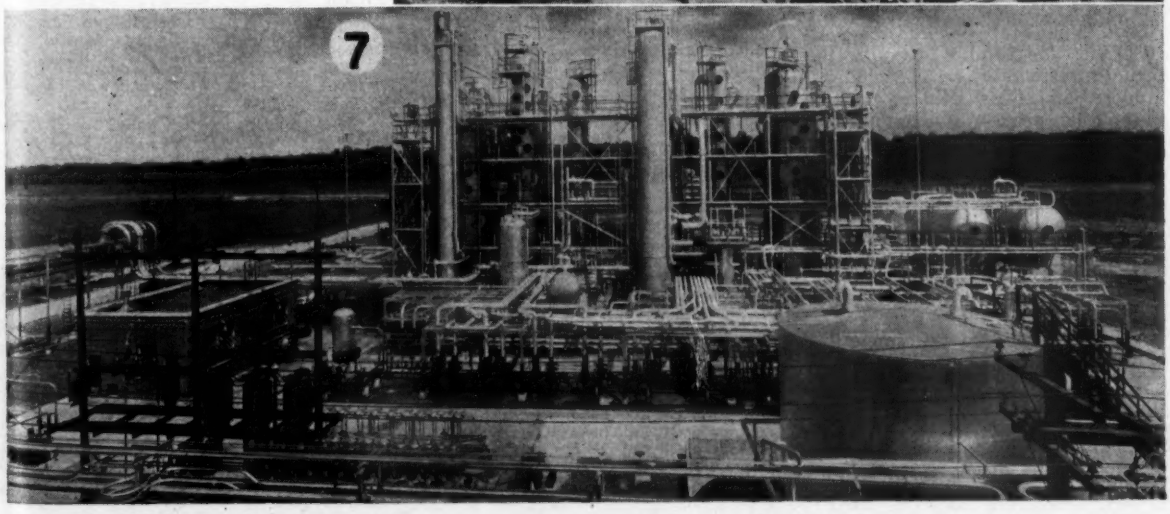
It is interesting to note that in the majority of cases, solvent-extraction capacity has narrowed down to three processes: Duo-Sol, phenol, and furfural. Also listed under "Solvent Processes Employed" are the capacities for propane and ketone-benzol dewaxing. Other extraction processes such as nitrobenzene, chlorex, and sulfur dioxide are in use. The latter is used especially to refine burning oils and solvent naphthas because of the extreme selectivity of SO_2 and its very low boiling point. Bari-Sol, hexane, and other processes are employed to some extent for dewaxing or similar purposes, but the great bulk of the capacity is handled by the processes mentioned. This means, of course, that experience has found that both quality of product and the economics of processing are served best by these processes which are most widely operated.

Reference to Table 2 shows that for 1946 our national annual production of lubricating oils of all types (U. S. Bureau of Mines reports) amounted to 46,367,000 bbl., or about 127,000 bbl. per calendar day. If we assume a demand for 1947 of 50,000,000 bbl., which amounts to about 137,000 bbl. per calendar day, we still shall have adequate capacity for our domestic needs, provided, of course, the refiners in each case can obtain enough crude to satisfy their throughput needs.

The Journal's survey also shows







(5) Propane deasphalting lube plant, Sinclair Refining Co., Houston

(6) Propane solvent-dewaxing plant, Humble Oil & Refining Co., Baytown, Tex.

(7) Phenol extraction process unit, Humble Oil & Refining Co., Baytown, Tex.

(Table 3) the direction of the wind as to new capacity, and indicates definitely that refiners are not resting on their laurels, solvent-treating-wise. More than 63,000 bbl. per calendar day of solvent-extraction capacity is in operation, and more than 41,000 bbl. per calendar day of extraction capacity under contract or construction. Correspondingly, nearly 44,000 bbl. per calendar day of extraction capacity was in operation at the same time, with more than 41,000 under contract or construction.

Singularly enough, foreign extraction capacity is nearly 20,000 bbl. per calendar day, with 9,600 contracted for. The new work is mostly to replace capacity destroyed during the war, we are told. Foreign solvent dewaxing capacity installed amounts to 15,000 bbl. per calendar day, with 13,600 under contract.

With these added capacities in operation, and with the probable exception of a certain important amount of Pennsylvania Grade crude lubricating-oil capacity, it appears likely that the solvent-refining capacity of the country will be more than ample to supply the needs for top-grade lubricants. This applies especially to lubricants employed in automotive and aviation engines, and in other applications where viscosity index, oxidation, sludging, and varnish resistance at elevated temperatures are properties of primary importance. Needless to remark, the availability of the most desirable crudes for these purposes, in amounts to meet the demand, is more and more doubtful. There may be an implied necessity for refiners to process less desirable crudes, resulting in lowered yields for any given charge capacity, when meeting competitive specifications in the market.

As for many years, there is much interest in the volumes of lube oils going into the various S.A.E. viscosity classifications. Table 4 shows that two-thirds of the total consumption of lube oils (not including turbine and similar oils) apparently falls in the S.A.E 20 and S.A.E 30 classes. About 13 per cent goes into the S.A.E. 10 grade. The 20 and 10 grades here include the winter, or 10W and 20W grades. Some 6 per cent is marketed in the other grades, an amount higher, it appears, than has been surmised by many observers. Averages, however, are often deceptive so this value can be assumed only tentatively. These grade consumption values were obtained direct from several oil companies who market large quantities of all kinds of lubricants, and it is believed that these averages are well within the order of magnitude of the correct values.

No data are available regarding the capacity of existing or contracted-for solvent extraction units which may be planned to apply to the upgrading of burning oils, diesel fuels, and other nonlubricant products.

New Journal Survey of U. S.

TABLE 1—LOCATION, CAPACITIES, AND REFINING PROCESSES OF U. S. LUBRICATING OIL REFINERIES
(In Operation and Under Construction)

Company and location—	Capacity, bbl. per day: Charge cap.	Capacity, bbl. per day: Finished oil cap.	Types of processes
Atlantic Ref. Co., Philadelphia	.....	4,700	Nitrobenzene, Phenol, Propane deasph., MEK dewaxing
Bayou State Oil Co., Hosston, La.	.....	400	Acid and Clay
Calumet Ref. Co., Burnham, Ill.	.....	300	Acid and Clay
Calumet Ref. Co., Princeton, La.	.....	200	Acid and Clay
Cities Service Oil Co., Titusville, Pa.	.....	750	None
Cities Service Oil Co., Ponca City, Okla.	.....	1,050	Acid and Clay
Citcon Corp., Lake Charles, La.	.....	†6,000	Furfural, Duo-Sol, MEK dewaxing
Champlin Ref. Co., Enid, Okla.	.....	1,300	Duo-Sol
Champlin Ref. Co., Enid, Okla.	.....	500	Phenol
Continental Oil Co., Ponca City, Okla.	.....	1,800	Duo-Sol, Furfural, MEK; Bari-Sol, Hexane
Continental Ref. Co., Oil City, Pa.	.....	400	None
Cooperative Ref. Assn., Coffeyville, Kans.	.....	1,500	Furfural
Crown Central Pet. Corp., Houston	.....	1,300	None
Deep Rock Oil Co., Cushing, Okla.	.....	864	None
Evangeline Ref. Co., Jennings, La.	.....	100	None
Freedom-Valvoline Oil Co., Butler, Pa.	.....	500	None
Freedom-Valvoline Oil Co., Freedom, Pa.	.....	800	None
Gulf Oil Corp., Philadelphia	.....	1,100	Duo-Sol, Furfural, Phenol
Gulf Oil Corp., Port Arthur, Tex.	.....	12,000	Duo-Sol, Furfural, Phenol
Humble Oil & Refining Co., Baytown, Tex.	*†6,200	.....	Propane
Humble Oil & Refining Co., Baytown, Tex.	*†7,300	.....	Phenol
Humble Oil & Refining Co., Baytown, Tex.	*†4,600	.....	MEK-Benzol
Humble Oil & Refining Co., Baytown, Tex.	*5,000	.....	Acid treating
Humble Oil & Refining Co., Baytown, Tex.	8,000	.....	Clay treating
Kendall Ref. Co., Bradford, Pa.	.....	1,200	Phenol
Kendall Ref. Co., Bradford, Pa.	.....	*1,500	Propane dewaxing
Lion Oil Co., El Dorado, Ark.	.....	1,000	Vac. Dist. (Spec.)
MacMillan Pet. Corp., Norphlet, Ark.	.....	1,700	Vac. Dist. (Spec.)
Magnolia Pet. Co., Beaumont, Tex.	*2,600	.....	Duo-Sol
Magnolia Pet. Co., Beaumont, Tex.	*3,400	.....	Furfural
Magnolia Pet. Co., Beaumont, Tex.	*4,400	.....	MEK dewaxing
Magnolia Pet. Co., Beaumont, Tex.	.....	3,500	.....
McBride Ref. Co., LaBlanca, Tex.	.....	75	None
Mid-Continent Pet. Corp., Tulsa	4,000	.....	Chlorex
Pennsylvania Ref. Co., Titusville, Pa.	.....	300	None
Pennsylvania Ref. Co., Karns City, Pa.	.....	300	None
Pennzoil Co., Oil City, Pa.	4,220	.....	Chlorex and MEK dewaxing
Phillips Pet. Co., Okmulgee, Okla.	.....	1,000	Acid and Clay
Pure Oil Co., Cabin Creek, W. Va.	.....	515	None
Pure Oil Co., Nederland, Tex.	.....	2,300	Phenol extr., MEK dewaxing, Propane deasph.
Quaker State Oil Ref. Co., Emlenton, Pa.	800	.....	Furfural
Quaker State Oil Ref. Co., McKean, Pa.	200	.....	Furfural
Quaker State Oil Ref. Co., Oil City, Pa.	700	.....	None
Quaker State Oil Ref. Co., St. Mary's, W. Va.	800	.....	Furfural
Richfield Oil Corp., Los Angeles	.....	250	None
Shell Oil Co., Inc. (Calif.), Martinez, Calif.	*2,650	.....	SO_2
Shell Oil Co., Inc. (Calif.), Martinez, Calif.	*3,000	.....	Furfural
Shell Oil Co., Inc. (Calif.), Martinez, Calif.	.....	3,100	.....
Shell Oil Co., Inc., Houston	*†3,800	.....	Propane deasph.
Shell Oil Co., Inc., Houston	*†5,400	.....	Phenol
Shell Oil Co., Inc., Houston	*†3,700	.....	MEK-Benzol dewax.
Shell Oil Co., Inc., Houston	.....	2,800	.....
Shell Oil Co., Inc., Wood River, Ill.	*3,000	.....	Duo-Sol
Shell Oil Co., Inc., Wood River, Ill.	*3,300	.....	Propane deasph.
Shell Oil Co., Inc., Wood River, Ill.	*3,600	.....	Propane dewax.
Shell Oil Co., Inc., Wood River, Ill.	.....	3,100	.....
Sherwood Ref. Co., Warren, Pa.	.....	1,000	Alcohol (Spec.)
Sinclair Ref. Co., Coffeyville, Kans.	2,800	.....	Centrif. dewax.
Sinclair Ref. Co., East Chicago, Ind.	3,000	.....	None
Sinclair Ref. Co., East Chicago, Ind.	Resid. †3,250 or Neut. *†5,000		MEK dewaxing, Phenol, Propane deasph.
Sinclair Ref. Co., Houston	.....	*5,000	MEK dewaxing
Sinclair Ref. Co., Houston	.....	5,500	Phenol
Sinclair Ref. Co., Houston	.....	3,300	Propane deasph.
Sinclair Ref. Co., Sand Springs, Okla.	1,250	.....	None
Sinclair Ref. Co., Wellsville, N. Y.	*4,500	.....	MEK dewaxing
Sinclair Ref. Co., Wellsville, N. Y.	1,200	.....	Nitrobenzene plus H_2SO_4
L. Sonneborn Sons Co., Franklin, Pa.	.....	500	None
L. Sonneborn Sons Co., Petrolia, Pa.	.....	500	None
Standard Oil Co. (Calif.), Richmond, Calif.	4,500	.....	Phenol
Standard Oil Co. (Calif.), Richmond, Calif.	*12,000	.....	RPM solvent
Standard Oil Co. (Calif), Richmond, Calif.	*5,800	.....	MEK-Benzol dewax.
Standard Oil Co. (Ind.), Casper, Wyo.	.....	225	Chlorex
Standard Oil Co. (Ind.), Whiting, Ind.	.....	1,750	Phenol
Standard Oil Co. (Ind.), Wood River, Ill.	.....	1,000	Chlorex
Standard Oil Co. (N. J.), Baton Rouge	8,800	.....	Phenol
Standard Oil Co. (N. J.), Baton Rouge	*4,300	.....	Propane deasph.

Lubricating-Oil Refineries, Processes

TABLE 1—LOCATION, CAPACITIES, AND REFINING PROCESSES OF U. S. LUBRICATING OIL REFINERIES (Continued)
(In Operation and Under Construction)

Company and location—	Capacity, bbl. per day: Charge cap.	Finished oil cap.	Types of processes
Standard Oil Co. (N. J.), Baton Rouge	*1,800	.....	Bari-Sol dewax.
Standard Oil Co. (N. J.), Baton Rouge	*3,900	.....	Propane deasph.
Standard Oil Co. (N. J.), Baton Rouge	5,200	.....	Phenol
Standard Oil Co. (N. J.), Baton Rouge	*4,200	.....	MEK-Benzol dewax.
Standard Oil Co. (N. J.), Bayonne, N. J.	2,600	.....	Phenol
Socony-Vacuum Oil Co., Inc., Buffalo	.....	1,000	None
Socony-Vacuum Oil Co., Inc., Olean, N. Y.	2,100	.....	Chlorex, MEK dewaxing
Socony-Vacuum Oil Co., Inc., Paulsboro, N. J.	10,000	.....	MEK dewaxing, Duo-Sol
Standard Oil Co. (Ohio), Cleveland	2,200	.....	None
Standard Oil Co. (Ohio), Toledo	1,200	.....	None
Sun Oil Ca., Marcus Hook, Pa.	.....	2,200-7,500	MEK dewaxing, Duo-Sol, Spec. Vac. Dist., Furfural (Bldg.)
The Texas Co., Lawrenceville, Ill.	.....	1,000	Furfural, MEK-Benzol dewax.
The Texas Co., Port Arthur, Tex.	.....	*4,500	Propane deasph.
The Texas Co., Port Arthur, Tex.	.....	5,000	Furfural
The Texas Co., Port Arthur, Tex.	.....	*1,300	SO_2-Benzol, MEK-Benzol
Tide Water Associated Oil Co., Avon, Calif.	.....	1,660	SO_2
Tide Water Associated Oil Co., Bayonne, N. J.	.....	1,500-*1,000	SO_2, MEK-Benzol
Union Oil Co. of Calif., Oleum, Calif.	.....	450	Phenol, Propane dewax.
Union Oil Co. of Calif., Oleum, Calif.	.....	500	SO_2-Benzol
Union Oil Co. of Calif., Oleum, Calif.	.....	105	(H_2SO_4)
United Ref. Co., Warren, Pa.	1,250	.....	None
Waverly Oil Works Co., Pittsburgh	.....	275	None
Wolf's Head Oil Ref. Co., Reno, Pa.	600	.....	None
Total	65,420	94,919	

*Indicate figure is not included in grand total. †Indicates new unit under construction.

TABLE 2—U. S. PRODUCTION OF LUBRICATING OILS, 1941-46
(Bureau of Mines)

Year—	1941	1942	1943	1944	1945	1946
Lubricants (1,000's bbl.)	39,539	38,626	38,679	41,106	41,867	46,367
Per cent of crude	2.8	2.9	2.7	2.5	2.4	2.65

Appalachian production—	1944	1945
Lubricants (1,000's bbl.)	5,278	4,891
Per cent of crude	9.4	8.7

TABLE 3—OUTPUT CAPACITY OF LUBRICATING OIL SOLVENT PROCESSING UNITS
(B/CD = barrels per calendar day)

	B/CD	No. units
Installed—solvent extraction capacity:		
Total raffinate—U. S. (as of Sept. 1, 1947)	63,485	40
Total raffinate—foreign (as of Jan. 1, 1947)	19,630	26
Total raffinate—world (est.)	83,115	66
Installed—modern solvent dewaxing:		
Total dewaxed oil output—U. S. (Sept. 1, 1947)	43,710	29
Total dewaxed oil output—foreign (Jan. 1, 1947)	15,227	21
Total dewaxed oil output—world (est.)	58,937	50
Building and under contract (Dec. 15, 1947):		
Solvent extraction:		
Raffinate output—U. S.	41,570	13
Raffinate output—foreign	9,591	6
Total output	51,161	19
Building and under contract (Sept. 1, 1947):		
Modern solvent dewaxing:		
Dewaxed oil output—U. S.	41,436	16
Dewaxed oil output—foreign	13,641	7
Total dewaxed oil output	55,077	23

TABLE 4—AVERAGE DISTRIBUTION AND CONSUMPTION OF LUBRICATING OILS IN THE VARIOUS S.A.E. CLASSIFICATION GRADES
(Percentages of total sales)

S.A.E. grade	Company "A" Jan.-Feb. av. (%)	Company "A" July-Aug. av. (%)	Company "A" Yearly av. (%)	Company "B" Yearly av. (%)	Company "C" Yearly av. (%)	Over-all av. (%)
10	14.4	3.5	8.1	14	18	13.3
20	30.5	19.3	24.7	33	35	30.9
30	40.0	48.5	46.3	42	40	42.8
40	12.6	22.9	17.2	10	6	11.1
50	1.5	4.6	2.8	1	1	1.6
60	1.0	1.2	0.9	..	..	0.3

Benedum Field

(Continued from page 63)

a 1-in. choke on a 5-hour test. Later a bottom-hole regulator with a ½-in. orifice was run and the official gage of 888 bbl. of oil was made through ½-in. bottom and ¾-in. top chokes at a gas-oil ratio of 4,000 cu. ft. per barrel. A bottom-hole pressure of 5,225 psi. and bottom-hole temperature of 200° F. were recorded at 12,000 ft.

A heavy Emsco rig powered with three supercharged Buda engines drilled the well with 3½-in. drill pipe. At present a survey of leases is being conducted, after which Plymouth and Slick will move in one rig each for immediate spudding. Together, the two operators must drill 25 wells before 1950. Additional drilling by other companies will add to activity in the area, and contingent on the casing supply, brisk development of the field is expected to begin during 1948. Drilling will begin on a 40-acre pattern with staggered locations, the operators having requested and received a temporary 80-acre producing unit.

TABLE 2—SAMPLE TOPS IN SLICK-URSCHEL OIL CO. 1 ALFORD

Mississippian	missing
Devonian	10,018 ft.
Silurian	10,600 ft.
Fusselman	*10,600 ft.
Simpson	10,795 ft.
Waddell	*10,920 ft.
Joins	10,990 ft.
Ellenburger	11,020 ft.

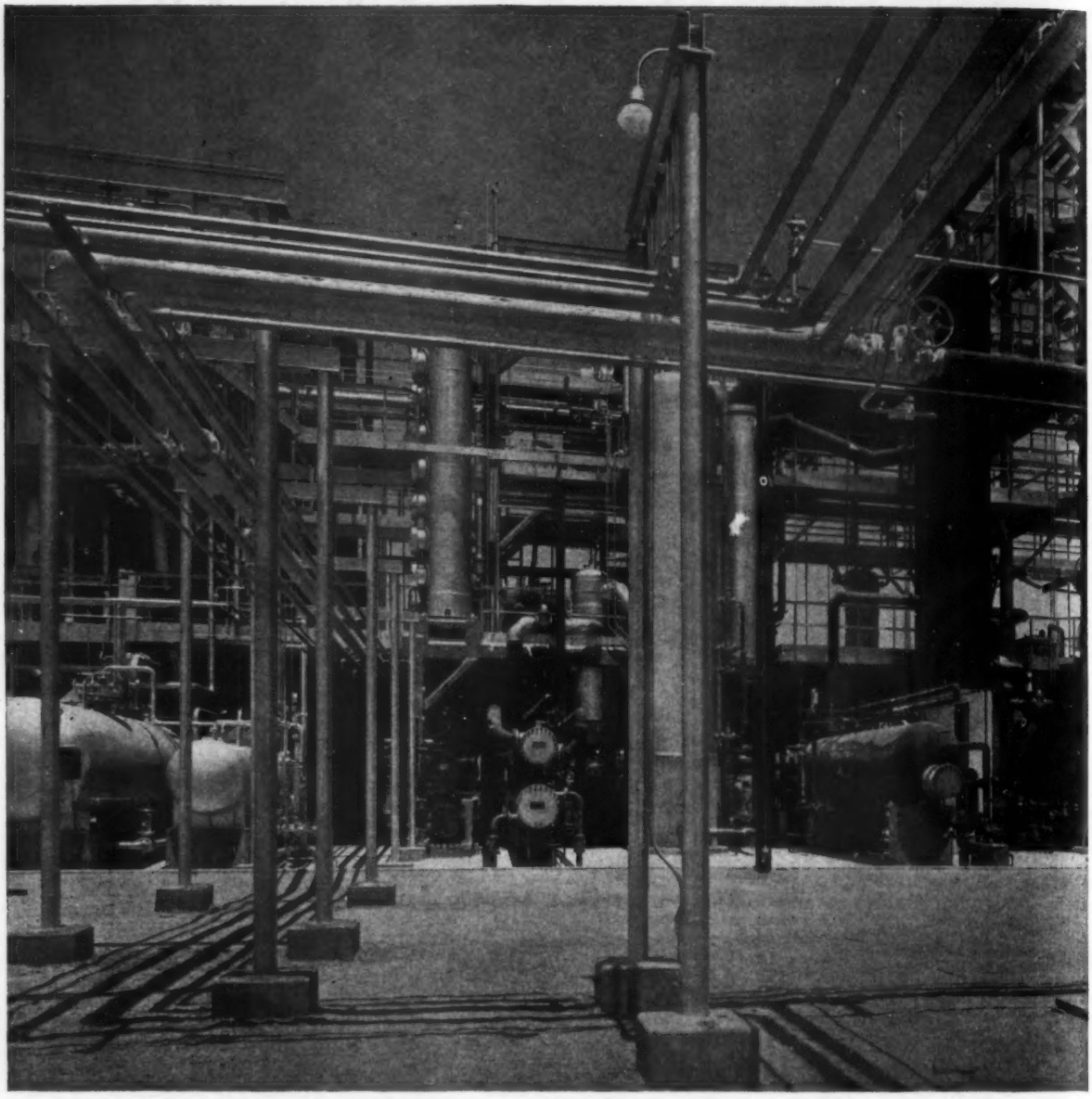
*Remnants present.

A geological survey of formation tops and thicknesses is now under way. Sample tops were picked as shown in Table 2. The Mississippian section is missing. The usual thinning of pre-Permian sections on structure was noted, but such sections were apparently subjected to much less erosion than evident in fields to the south. About 100-150 ft. of upper Ellenburger, not found in Big Lake, for example, is present in the Slick well. The geologic study of the formation in the new well indicates that 500 ft. or more of Ellenburger section remains below total depth.

The well is producing a 56°-gravity, straw-colored oil with a large gasoline fraction and a low sulfur content. It is to be expected that deeper penetration of the Ellenburger, possibly down structure from discovery, will reveal heavier oil.

Shell Pipe Line Co. is paying top regional price for the crude which is presently being trucked out of the area. The purchaser is now laying a $200,000 9½-mile 8-in. line to connect the new field with its gathering facilities in the region.

Both Jim Hewgley and Sam W. Hogan, Slick-Urschel petroleum engineer, devoted their full time to the drilling of the well, and are given principal credit for its successful completion.



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Petroleum refinery, chemical or petro-chemical plant. . . . After the process engineering—which must be correct for desired product yields and quality—comes the all-important matter of design engineering. For it vitally affects the cost of operation and maintenance.

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Directional Drilling

(Continued from page 73)

bob indicates the low side of the hole, while the combination of the two gives the azimuth of the tool since the single-shot picture taken before running the tool gave the necessary information regarding the true azimuth of the low side of the hole.

Deflection tools would be of little value without trained personnel to use them. This is the human element of know how and it is furnished by directional-drilling companies on a service basis. Usually two men are assigned to each directional-drilling project. They act in a supervisory capacity on a 24-hour day basis, orient deflection tools as required, plot the survey as taken, choose the drilling hookups, and decide as to weight on bit, pump circulation, rotation speed, type of bit, reamers, and so on.

A drilling proposal or guide map showing the particular well in both plan and section view is furnished the service crew and it is upon this proposal that the progress of the well is charted. The section view indicates the rate of increase in drift in intervals of 100-ft. depths until the required maximum angle is reached which will intersect the objective. The rate of increase is usually 2° 30′ per 100 ft. of measured depth but in extreme cases, an increase rate of 4° or more per 100 ft. has been required.

The depth at which deflection starts is dependent upon the total deviation required and the bottom depth of the hole. It is found that if the drift angle is 10° or more it is easier to keep a well on its bearing. Thus almost all deflection projects carry that minimum. If the objective distance is not great, and the well fairly deep, then a considerable portion of the hole will be drilled straight, with the deflected portion at the bottom.

The other extreme of getting the greatest deflection at the shallowest possible depth requires starting deflection at about 200 ft., building the drift angle at a rate of 4° per 100 ft. of measured depth until a maximum of slightly in excess of 60° from the vertical is reached. This angle is then maintained to bottom. By this plan, a hole can be deflected in excess of 3,000 ft. from the surface location at a vertical depth of 3,000 ft. Continued drilling at this angle will cause the hole to deviate additionally at the rate of 175 ft. for each additional 100 ft. of vertical depth. There are certain cases in Long Beach Harbor field which approximate the above conditions, but such a program could not be carried on to any great depth because of friction and length of the drill string.

Rig time is the most important financial factor in directional drilling. There are cases where directional wells are drilled more quickly than adjacent straight holes due to the excessive bit weights carried but there are exceptions. The rig-time factor has changed the complexion of directional drilling during the past 10 years. Formerly many round trips were made and all types of trick bits and drilling setups were used.

Today's policy is to set the first deflection tool to start the well on its course, then build drift as required by placing a reamer just above the bit and by use of weight cause the reamer to act as a fulcrum. No additional tool is set until the well drifts far enough off its course bearing that the full force of a tool run is required to turn it back. As a result, only from three to five runs are required on the average well.

The course of most directional drilled wells is rather closely confined as is the objective. Many wells are drilled in cylinder rights-of-way —that is, a cylinder of either 50 or 100-ft. radius is the allowable tolerance along the proposed course. Thus the average well is bottomed within 25 ft. of the original objective. This factor explains the excellent drainage pattern obtained through directional drilling. The magnitude of dog legs or sharp bends in the hole also is definitely restricted.

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	WELL No. 1		WELL No. 2	
	Year Before Install.	Year After Install.	Year Before Install.	Year After Install.
Paraffin Expense	$1347.00	-0-	$ 767	-0-
Bbls. Oil Prod.	9859	9046	9978	8502
Paraffin Cost per Bbl.	$ .137	-0-	$ .077	-0-
Expense Reduction First Yr's Operation	$1347		$ 767	
Installation Cost	401		401	
NET SAVING	$ 946		$ 366	

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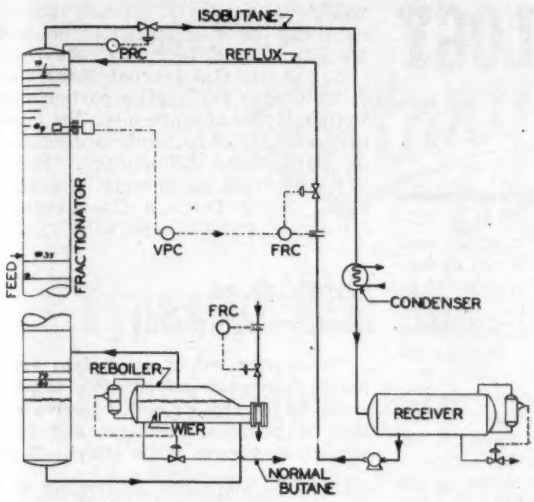


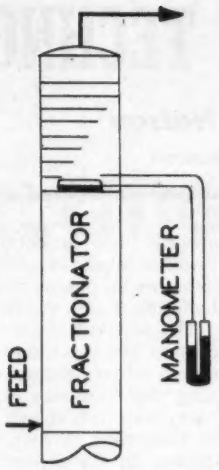


Fig. 1—(Left) Deisobutanizing column which fractionates isobutane from normal butane.
Fig. 2—(Right) Vapor-pressure balance

Control of Narrow-Boiling-Range Fractionating Columns

by G. G. Gallagher*

PRESENT-DAY petroleum-refining practices are working toward a higher and higher degree of separation of the narrow-boiling-range hydrocarbons; hence more accurate and more direct methods of instrumentation and control are required.

The usual means of temperature and pressure control, long used on ordinary fractionating columns, are not adequate for the superfractionators now encountered.

*Universal Oil Products Co., Chicago. Presented before the Chicago section of the Instrument Society of America.

Fig. 1 shows a deisobutanizing column which fractionates isobutane from normal butane. At 110-psi. column pressure, there is only 23° F. difference between the boiling point of pure isobutane and that of pure butane. On this basis a change of only 1° F. in column temperature will cause a change in composition of approximately 4 per cent. From this it can be seen that accuracy required is hardly possible with present-day temperature controllers. Even then, holding the temperature alone constant will not suffice since the purity of the product overhead may also vary in the order of 2 to 3 per cent with a change in pressure as small as 1 psi. Changes in barometric pressure alone can be responsible for variations of several per cent in the purity of the overhead material.

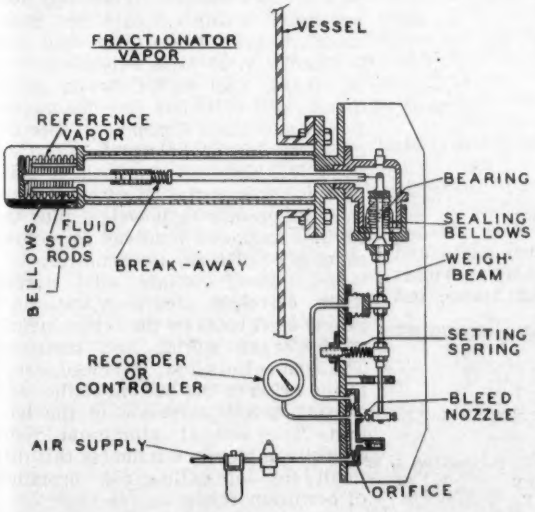
From the foregoing it can be seen that it is important to maintain both pressure and temperature within very close limits. Since temperature and pressure controllers with the required accuracy were not available, a search was made for a better method of control. What was most desired was a composition controller that would make the necessary adjustments to the process for variation in column temperature, pressure, feed composition, or feed quantity.

New Vapor-Pressure Controller

One method which has been developed for controlling such narrow-boiling-range columns is commonly known as a vapor-pressure controller, although on strictly binary columns it is essentially a composition controller. This instrument consists of a temperature bulb and pressure connection, both being located at the same point in the column (Figs. 2 and 3).

The temperature bulb is partly filled with one of the materials being fractionated. This bulb when exposed to the column temperature will exert a vapor pressure against one side of the diaphragm or mercury U-tube, the other side of which is opposed by the pressure of the column taken at the same point that the temperature-sensitive bulb is located. Whenever the material at this point in the column is of the same composition of that in the bulb, no differential on

(Continued on page 140)



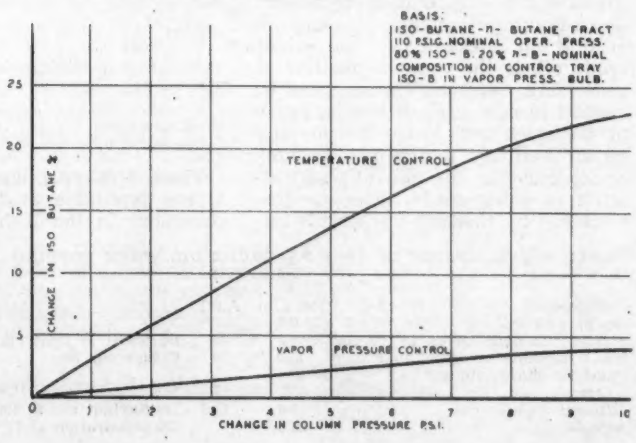


Fig. 3—(Left) A vapor-pressure transmitter. Fig. 4—(Right) Composition change on control tray vs. column-pressure deviation for binary column using vapor-pressure controller or temperature controller

QUESTIONS on TECHNOLOGY

by W. L. Nelson

Consulting Engineer

Utilization of Low Gravity Crude Oils

How would a crude oil of 12°-16° A.P.I. be processed? What would be the products?—R. G.

Such a crude oil is obviously not of much value. It is inherently deficient in hydrogen, and conversely rich in high-boiling asphaltic materials. No fancy method of processing will erase these inherent deficiencies. In addition, such crude oils usually contain large amounts of sulfur which further complicates the utilization of such oils because of difficulties with corrosion.

Almost invariably such crude oils contain excellent asphalts and although they usually contain a larger percentage of lubricating oil than any other group of crude oils, and although the cost of lubricant manufacture may be low because they contain very little wax, the lubricating oils from such crude oils are thought to be inferior because their viscosity changes rapidly with changes in temperature. This inadequacy of the lubricating oils can be greatly improved by means of solvent-extraction treating processes but these are expensive and the yield of reasonably good lubricating oil is only about half of the untreated yield. *(See Comparison of Solvent Treating Processes, The Oil and Gas Journal, February 10, 1945, page 113.)* The 50 per cent loss is recoverable, however, in the form of a low-gravity distillate which can be cracked, or incorporated into road oil or black fuel oil.

Only small amounts of lubricating oil and of asphaltic products are marketed and hence most of such crude oil must be processed by cracking. Thermal cracking, employing several down-flow reaction chambers and operating on substantially the whole crude oil, is the common method of processing. Catalytic cracking can be applied to only a short boiling range of feedstock and hence it can only be an auxiliary to thermal cracking or for cracking the gas oil when asphalt is being made. The gasoline produced by thermal cracking is relatively high in octane number and hence catalytic cracking is not as valuable as an octane improver as when handling other crude oils.

The breakup shown in Table 1 indicates the approximate yields obtained when processing by plain topping and reducing distillations. The basic materials shown in Table 1 may be processed in several ways, as indicated in the following breakups:

Breakup 1—Catalytic cracking of the 30.7 per cent of light cracking stock and selling the inferior lubricating oil without solvent treating.

	Per cent
Losses and unaccounted for	3.6
Premium gasoline	17.0
Distillate fuel oil	11.0
Catalytic fuel oil	15.4
Lube oil (low v.i.)	15.0
Asphalt	38.0
Total	100.0

Breakup 2—Cutting back the asphalt with distillate to make road oil, and catalytically cracking the entire 46.7 per cent of catalytic charge stock.

	Per cent
Losses and unaccounted for	2.5
Premium gasoline	26.0
Catalytic fuel oil	21.5
Road oil	50.0
Total	100.0

Breakup 3—Thermally cracking everything (84.7 per cent) except the naphtha and distillate fuel oil.

	Per cent
Losses and unaccounted for	2.8
Distillate fuel oil	11.0
Good gasoline	31.0
Black fuel oil	55.2
Total	100.0

Breakup 4—Thermally cracking the entire crude oil.

	Per cent
Losses and unaccounted for	3.9
Good gasoline	38.0
Black fuel oil	58.1
Total	100.0

Breakup 5—Coking the entire crude oil.

	Per cent
Good gasoline	59.0
Coke—about 0.063 ton per bbl.	

These breakups, particularly 3 and 4, are profitable at today's market conditions in the United States, but would ordinarily be scarcely profitable. The paper by Mithoff, Sipos and MacPherson, "California Crude Oils" *(The Oil and Gas Journal, November 6, 1941, page 81)* applies particularly to these types of crude oils. The thermal cracking of such oils is discussed by Mitoff and Schimansky, "Reaction Chambers in Thermal Cracking Units," *(The Oil and Gas Journal, November 6, 1941, page 135)*.

TABLE 1—EVALUATION OF 14° A.P.I. CRUDE OIL WHEN TOPPING AND REDUCING TO ASPHALT

Material—	Per cent	A.P.I.	Notes
Distillation loss	0.3		
Straightrun naphtha up to 400 ep.	4.0	45	Deficient in light ends, excellent O.N.
No. 1 distillate or diesel fuel	11.0	30	Cetane No. 38
Catalytic charge stock:			
Light	30.7	20	
Heavy or lube cut	16.0	14.5	750 Saybolt vis. at 100° F.
Asphalt	38.0		100 penetration at 77° F.

Corrosion of Aluminum by Oils

The writer would appreciate very much to receive information, if possible, on the erosive and corrosive action of gasoline, kerosine, and fuel oils on aluminum or its alloys.—S. R.

Little is available concerning the corrosive resistance of aluminum to oils, mainly because its resistance to such materials is generally known.

Aluminum is employed mainly in the two following general types of alloys: (1) Substantially pure (0.3 per cent iron impurity), and (2) numerous alloys in which aluminum contitutes about 88-98 per cent and the rest of the material consists primarily of copper, silicon, and magnesium *(see Composition of Aluminum Alloys, The Oil and Gas Journal, December 28, 1946, page 272)*. In a most general way the purer the alloy or material, the greater its resistance, but this is of little significance with respect to finished or treated oils because they do not corrode aluminum alloys. It is, however, of mild significance with respect to sour crude oils or untreated naphthas or distillates.

In many services the resistance of aluminum alloys to corrosion is due to the formation of a tenacious film of corrosion product on the surface of the material. If this film is broken or removed, the alloys are attached rapidly and hence alloys should not be used for abrasive services where wear or rubbing will continually expose a clean surface. Again, this does not apply to finished gasolines, kerosines, or even high-sulfur fuel oils.

Aluminum is used extensively for oil tanks, fuel tanks, truck tanks, drums, and cylinders *(see Aluminum Tanks and Field Equipment, The Oil and Gas Journal, December 2, 1944, page 64)*. They are particularly suitable for transportation service where their inherently light weight plus the savings in power involved in moving them is of primary importance.

In sour-oil (crude oil) storage tanks, corrosion occurs on the under side of steel roofs by the action mainly of hydrogen sulfide and moisture. The iron sulfide, etc., produced, drops to the brine in the bottom of the tank causing severe corrosion of the bottom. The use of aluminum roofs almost completely eliminates this difficulty by forestalling the formation of corrosion debris on the roof.

MODERN Rotary DRILLING

Types of Bits and Penetration Data

PROGRESS made in recent years in drilling bits has led to improvement of details of design and of materials used and to increase of precision of manufacturing methods. Two basic types of drilling bits are still being used. These are the blade-type bits, depending on the scraping action and used in soft formations and the rock-type medium and hard-formation bits, employing crushing action. Special-purpose bits are used in specific applications.

As far as blade bits are concerned, two, three, and four-bladed bits are available. The two-bladed bits are still in most common usage, although a trend toward three-bladed bits has been noted in past 2 years by some manufacturers. Improved manufacturing methods have resulted in perfectly centered, well-balanced designs. A majority of modern blade-type bits have replaceable alloy-steel blades which can be centered correctly and welded in the bit head without use of any special auxiliary centering tools.

Rock bits are manufactured in several types, adapted to drilling of a very broad range of formations, from medium-soft to hardest and most abrasive formations such as chert. This wide range of application is obtained by changes in geometry of spacing and coarseness of the teeth and in design of the cutters.

There appears to be very little room left for further improvement in materials used for hard facing of the bits, unless use of diamonds is resorted to. On Moh's Scale of Hardness diamonds rank 10, while tungsten carbide, generally used as hard-facing material, ranks 9.4. Because of this fact, the diamond-coring techniques being used in several fields are watched with considerable interest.

Diamond coring requires special techniques as to proper weight on bit, speed of rotation, and volumes of circulation. In certain fields diamond coring has been so successful that it is used to reduce drilling time through some of the formations, with the core itself taking a secondary consideration. Experiments with solid diamond bits, which cut a full hole, so far largely have been unsuccessful. The reason for this is that the cutting action of the diamonds is based on the grinding principle and requires a certain correct speed to be effective. In the normal rotation of the bit, diamonds located on the periphery of the bit may be moving with the correct cutting speed, while the diamonds located at the center of the bit are practically stationary. As a result the outside edge of the bit cuts into the formation, placing a continuously increasing load on the center of the bit. This load destroys the center of the bit.

Helpful Data and Studies

It has been stated in the preceding installment that one of the means of maintaining good drilling efficiency under present drilling conditions are the attempts to increase the life expectancy and rate of penetration of the bits. These efforts include bit improvements, above referred to, and studies of the factors which affect the life and rate of penetration of the bits. These factors are the characteristics of the formation drilled, use of proper types of bits in any given formation, effects of characteristics and volumes of circulation of drilling mud, and effect of weight on the bit and speeds of rotation.

The studies conducted by oil operators and bit manufacturers include both collection and analysis of field data and laboratory experiments. Each of these two types of studies has its limitations. The difficulties of field tests, centering around the fact that so many variable factors have to be considered, are increased by the human control element. This factor involves the ability and personal judgment of the driller and is difficult to evaluate. In laboratory experiments all the variables are under control and can be changed at will. Just because of this fact, however, the results of laboratory experiments are not fully applicable to field conditions.

Despite these limitations of the investigations, their results have been highly satisfactory as indicated by the trend of improvements of rates of penetration and life of bits under difficult drilling conditions. Best proof of the value of analysis of bit-performance data is the fact that in any new field there is a gradual improvement in service secured from bits as more wells are drilled and more drilling data becomes available.

Of considerable help in these investigations was development, in the past few years, of reliable instruments which furnish graphic records of the rate of penetration. Value of this type of data was realized for a long time and the information was secured in the past by the driller keeping time records of the drilling progress. Modern rate-of-penetration recording instruments eliminate this additional work for the driller and assure accuracy. They are automatic in operation and make a record only when the bit is on the bottom of the hole and when footage is actually made. Many other useful purposes have been found for records furnished by these instruments, in addition to use for analysis of bit performance.

Studies of rates of penetration have resulted in evolving of formulas, methods of calculation, and graphic procedures which deal with the economics of bit service. These formulas and methods have been reported at different times in technical literature. Some of the references on the subject are given below.

References

1. C. A. Yeatman: "Practical Utilization of Rate-of-Penetration Drilling Data." A paper presented before the midyear meeting of the Division of Production of A.P.I.-Fort Worth, May 1940.
2. "Cost Study Shows Value of Designed Bit Program," The Oil and Gas Journal, October 22, 1942, p. 67.
3. "Determining Cost per Foot of Bit Service," The Oil and Gas Journal, March 12, 1942, p. 49.
4. W. S. Crake: "Modern Rotary Drilling Machinery and Practices," The Oil and Gas Journal, August 11, 1945.

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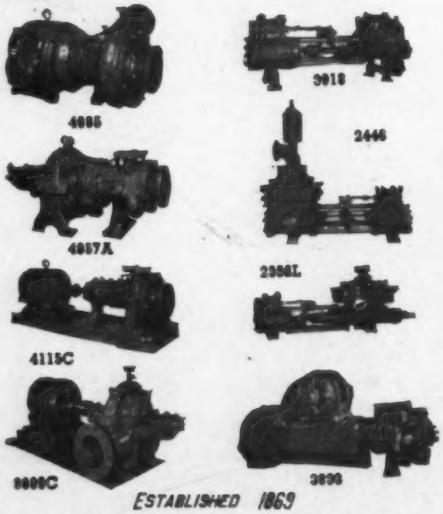

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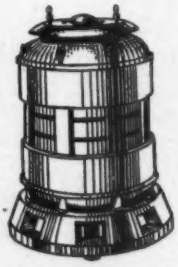

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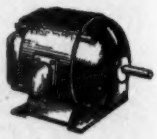

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The Refiner's Notebook

A WEEKLY FEATURE OF THE OIL AND GAS JOURNAL

10—Pipe and Tubing Sizes (22–60 In.)

Nominal pipe size (in.)	Steel pipe			Cast iron pit-cast			Chemical ware		Clay Sewer pipe	
	Schedule	O.D. (in.)	I.D. (in.)	O.D. (in.)	Grade	I.D. (in.)	O.D. (in.)	I.D. (in.)	O.D. (in.)	Thickness
22	...	...	.....	....	..	....	25.0	22.0	24.5	1.75
24	10	24	23.500	25.80	1	24.32	27.0	24.0	28.0	2.0
	20	24	23.250	25.80	2	24.20	26.5	24.0	....	....
	30	24	22.876	25.80	3	24.08	27.0	22.75	....	....
	40	24	22.626	26.32	4	24.46	....	....		
	60	24	22.126	26.32	5	24.32	....	....		
	80	24	21.564	26.32	6	24.16	....	....		
	100	24	21.000	26.32	7	23.98	....	....		
	120	24	20.500	26.90	8	24.38	....	....		
	140	24	19.876	26.90	9	24.18	....	....		
	160	24	19.376	26.90	10	23.96	....	....		
	...	..	.....	27.76	11	24.58	....	....		
	...	..	.....	27.76	12	24.32	....	....		
	...	..	.....	27.76	13	24.04	....	....	....	....
26	...	..	.....	....	..	....	29.0	26.0	....	....
	...	..	.....	....	..	....	29.5	27.0	....	....
30	10	30	29.376	31.74	1	30.00	31.50	28.0	31.50	2.25
	20	30	29.000	32.00	2	30.12	33.50	30.0	35.00	2.50
	30	30	28.750	32.00	3	29.96	32.50	30.0	....	....
	...	..	.....	32.40	4	30.20	33.25	28.25	....	....
	...	..	.....	32.74	5	30.36	....	....	....	....
	...	..	.....	32.74	6	30.16	....	....	....	....
	...	..	.....	32.74	7	29.96	....	....	....	....
	...	..	.....	33.10	8	30.10	....	....	....	....
	...	..	.....	33.46	9	30.22	....	....	....	....
	...	..	.....	33.46	10	29.96	....	....	....	....
36	...	..	.....	37.96	1	36.02	39.5	36.0	38.25	2.625
	...	..	.....	38.30	2	36.20	....	....	41.50	2.75
	...	..	.....	38.30	3	36.04	....	....	....	....
	...	..	.....	38.70	4	36.26	....	....	....	....
	...	..	.....	38.70	5	36.06	....	....	....	....
	...	..	.....	39.16	6	36.30	....	....	....	....
	...	..	.....	39.16	7	36.08	....	....	....	....
	...	..	.....	39.60	8	36.28	....	....	....	....
	...	..	.....	39.60	9	36.02	....	....	....	....
	...	..	.....	40.04	10	36.16	....	....	....	....
42	...	..	.....	44.20	*1	42.06	....	....	....	....
	...	..	.....	44.50	*2	42.18	....	....	....	....
	...	..	.....	45.10	*4	42.40	....	....	....	....
	...	..	.....	45.58	*7	42.16	....	....	....	....
48	...	..	.....	50.50	*1	48.14	....	....	....	....
	...	..	.....	50.80	*3	48.06	....	....	....	....
	...	..	.....	51.40	*4	48.44	....	....	....	....
	...	..	.....	51.98	*6	48.52	....	....	....	....
	...	..	.....	51.98	*8	47.94	....	....	....	....
54	...	..	.....	56.66	*1	54.06	....	....	....	....
	...	..	.....	57.10	*2	54.30	....	....	....	....
	...	..	.....	57.80	*4	54.54	....	....	....	....
	...	..	.....	58.40	*8	53.98	....	....	....	....
60	...	..	.....	62.80	*1	60.02	....	....	....	....
	...	..	.....	63.40	*2	60.40	....	....	....	....
	...	..	.....	64.20	*5	60.42	....	....	....	....
	...	..	.....	64.82	*8	60.06	....	....	....	....

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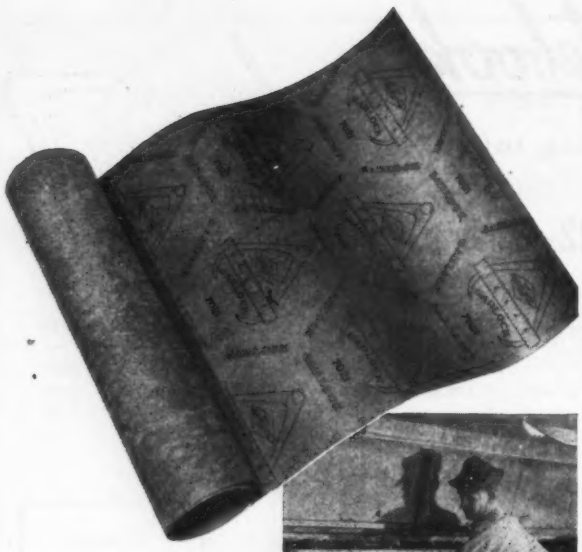
Notes—Refer to The Refiner's Notebook No. 173 (December 6) for Specifications and References.

Refiner's Notebooks 168, 169, 170, 172, 174, 175, 178, 179, and 181 are tabulations of smaller sizes of pipe and tubing.

No. 182 in a series by W. L. Nelson, professor of petroleum refinery engineering, University of Tulsa



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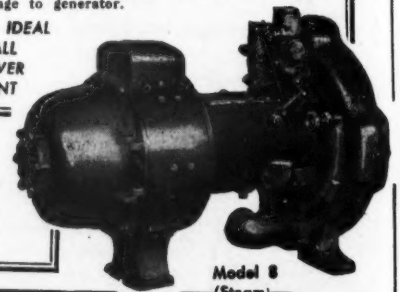

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ENGINEERING fundamentals

Combination of Permeabilities—Series Beds

THE effect of a change in pay permeability as a result of well completion or other practices is an important consideration in production technique. The magnitude of such changes can be arrived at by the treatment of flow through two permeable beds in series. The problem also has significance in other situations, such as computing an average weighted reservoir permeability and in computing the advance of a fluid interface through a permeable bed. The present discussion will outline the method of attacking the problem of beds in series.

In Fig. 1 is shown the system considered. For sake of convenience and interest of application the radial system is chosen. The permeability in a zone around the well bore differs from that at a distance. At the boundary between the two zones it is assumed that the permeability changes abruptly from k_1 to k_2. At this point of change there will exist a pressure P less than P_e but greater than P_w. It is assumed that flow is steady with time so that P does not change in value.

Darcy's law for a radial system will apply to either of the two zones in question or to the entire system. However, the same amount of flow must take place through each of the beds and through the entire system. The expressions for the two separate zones and for the entire system are, respectively,

$$Q = \frac{2\pi k_1 h (P - P_w)}{\mu \ln R/R_w} \quad (1)$$

$$Q = \frac{2\pi k_2 h (P_e - P)}{\mu \ln R_e/R} \quad (2)$$

$$Q = \frac{2\pi k_{avg} h (P_e - P_w)}{\mu \ln R_e/R_w} \quad (3)$$

The following relationship must also hold between the pressure differentials,

$$(P_e - P_w) = (P_e - P) + (P - P_w) \quad (4)$$

Therefore, by solving for each of the pressure differentials from Equations 1, 2, and 3, and substituting them in Equation 4, the following relationship is found:

$$k_{avg} = \frac{\ln R_e/R_w}{\frac{1}{k_1}\ln R/R_w + \frac{1}{k_2}\ln R_e/R} \quad (5)$$

This equation can be extended to the situation of any number of beds in series, in which case the equation is extended to read in the denominator the sum of terms for each permeable zone included. The relationship in Equation 5 can be used as a basis for estimating a number of useful quantities in production work. For example, the effects of mud invasion, acidizing, or well shooting can be estimated from it.

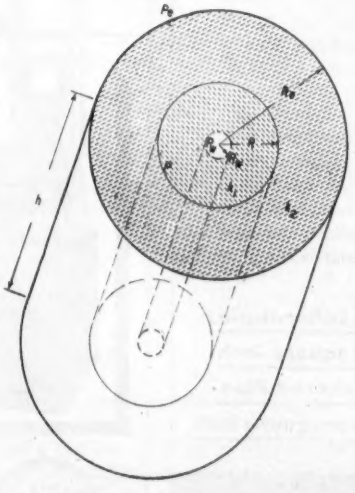

Fig. 1

First, consider the invasion of mud into a producing formation. Let it be supposed that a well of 6-in. bore is drilled into a pay of 500 md. on a spacing of 40 acres. Assume that mud penetrated for a distance of 1 ft. into the pay, and that experiment indicates that the pay will be reduced in permeability, where penetrated with mud, to a value of 10 per cent of its original. It is desired to know to what average permeability the well system is reduced by the mud penetration if it is not removed.

A 40-acre spacing gives a well about the equivalent of a 750-ft. drainage radius (R_e). The reduction by mud to 10 per cent permeability gives 50 md. for the invaded zone. Substituting the quantities given into Equation 5 yields, therefore,

$$k_{avg} = \frac{\ln 750/0.25}{\frac{1}{50}\ln 1.25/0.25 + \frac{1}{500}\ln 750/1.25} = 178 \text{ md.}$$

Due to the amount of mud invasion given, the well system flows as though it were from a pay of 178 md. rather than 500 md.

Second, consider the acidizing of a formation. Assume that a well on 40-acre spacing with a 6-in. bore produces 50 bbl. per day of fluid from a pay of 50 md. permeability before acidizing and 90 bbl. per day after acidizing, both rates being taken under identical producing conditions. Let it be said that sufficient acid had been injected to penetrate 15 ft. into the formation. From this data can be calculated the permeability increase which would have had to occur in the acidized section to produce the observed increase in production rate.

From the production rates given, the permeability after acidizing (k_{avg}) must be 90/50 times the permeability before acidizing (k_2). Therefore, substituting in Equation 5 gives,

$$(50)90/50 = \frac{\ln 750/0.25}{\frac{1}{k_1}\ln 15.25/0.25 + \frac{1}{50}\ln 750/15.25}$$

or, solving for k_1 yields a value of 373 md. for the acidized section.

Series prepared by Dr. John C. Calhoun, Jr., Petroleum Engineering School, University of Oklahoma

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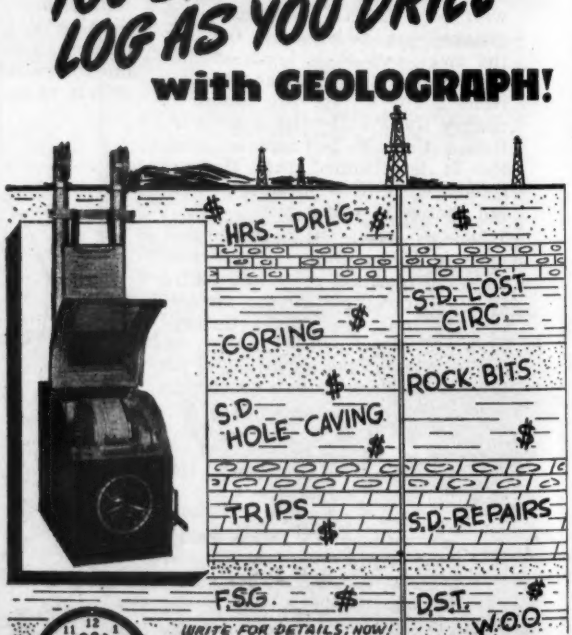

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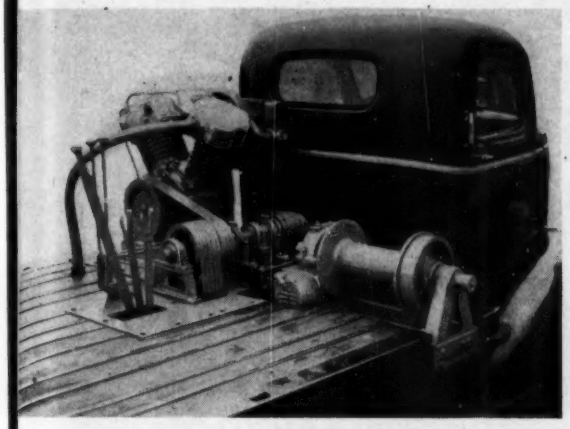
OIL AND GAS EQUIPMENT Digest

IT'S NEW CHECK IT

by John M. Spears

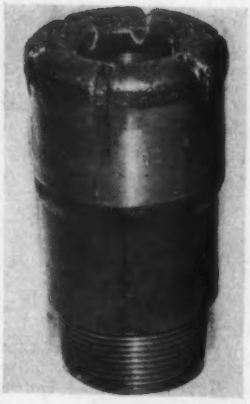
(1) TRUCK-MOUNTED COMPRESSOR WINCH is operated by power transmitted from the truck engine by a heavy-duty power takeoff installed in the truck's drive shaft. Countershaft with two individual Twin Disc



clutches provides for either simultaneous or separate operation of compressor and winch. Compressor is a standard Model 105-VC Auto-Air. It delivers 105 cu. ft. per minute at 100-lb. pressure. Winch is of 25,000-lb. capacity. Air receiver and double hose reels are mounted beneath the truck platform, thus effecting substantial space savings. Unit extends only 40 in. behind the truck cab, leaving ample space for the transportation of men, tools, and materials and is 38 in. high. *Truck Equipment Division, Davey Compressor Co.*

IT'S NEW CHECK IT

(2) CARBOMETAL DIAMOND BIT contains diamonds impregnated 1 in. deep for oil-field work. Bit presents a cutting face which is extremely robust and will withstand the application of considerable weight, pressure, and shock. It must be taken for granted that any bit will suffer some diamond loss in heavy oil-field work and with this point in mind the Carbometal drilling crown is constructed so that the breakaway diamonds or diamond pieces will not have any damaging effect on the crown itself. A diamond torn from the face leaves a patch consisting of other diamond particles, and also, of a matrix containing particles of highly wear-resistant and abrasive carbide. Impact of rock cuttings on this spot will simply have the effect of sharpening it and the diamond or piece of diamond which has broken away will be crushed to powder and washed out in the mud flush. Construction is such that even if in severe misuse a portion of the abrasive face is disintegrated, this will result in the bit wearing out faster, but will not incur any fishing jobs. *Amet Trading Corp.*



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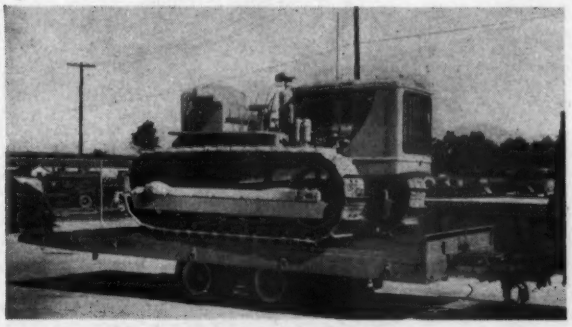
(3) NEW OIL-FIELD TRAILER eliminates all need for skidding, blocking, or winching and thus shortens to minutes the time required to load heavy equipment such as tractors, bulldozers, etc. When loading, tail skid



is lowered and loading platform is raised by means of hydraulically controlled, hand-operated pump. Equipment is driven on trailer, under its own power, with tail skid serving as ramp. Release valve is then opened so that loading platform will return to its original po-

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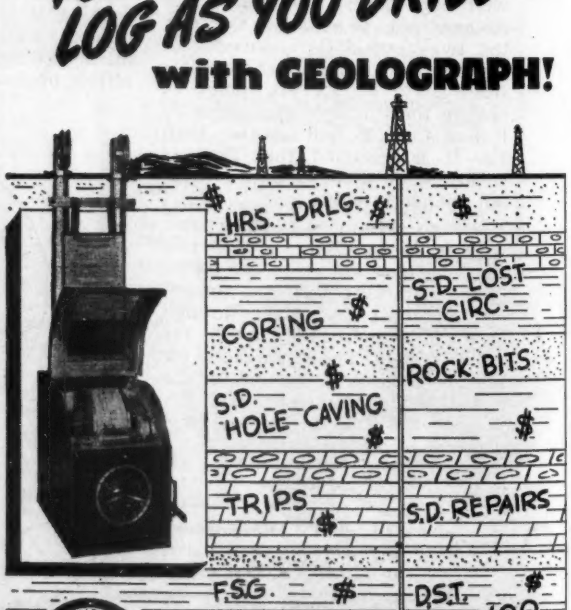

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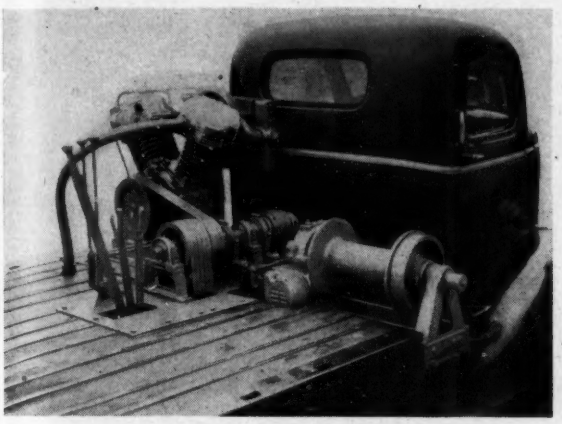

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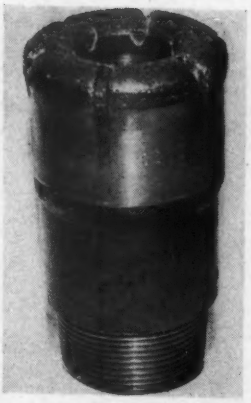

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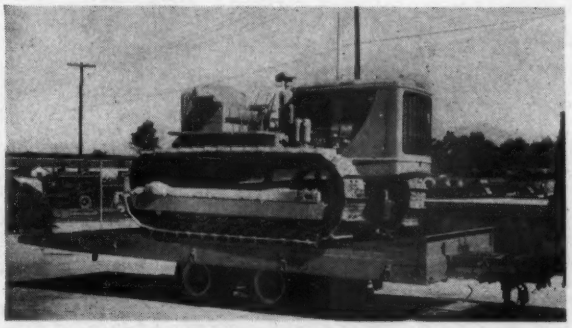

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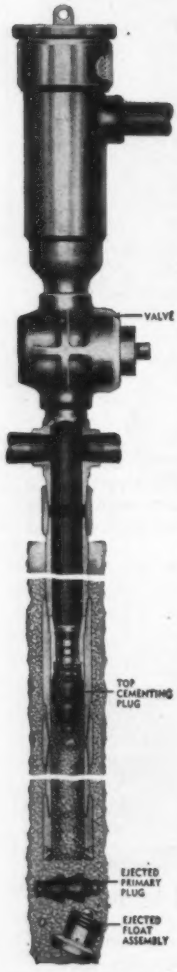
sition and automatically lock. Tail skid is then raised to shorten over-all vehicle length and to serve as barrier for load. Trailer also makes an excellent carrier for all types of oil-field equipment due to ease in loading provided by tilt ramp and clean body construction. Construction consists of pressed-steel frames which provide a liberal factor of safety. Two standard models are a 7-ton capacity (single axle) and a 12-ton capacity (tandem axle). *Arthur Rehberger & Son, Inc.*

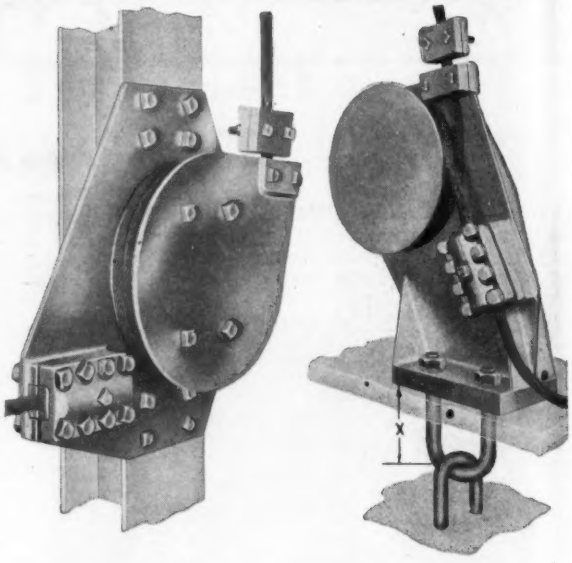
IT'S NEW CHECK IT



(4) FULLBORE TWO-PLUG CEMENTING METHOD incorporates the following improvements: (1) full-bore discharge opening from the well pipe to the hole annulus; (2) complete segregation of the cementing slurry to prevent well-fluid contamination; (3) piston-like back-pressure valve, which is carried by the top plug, to seal and lock in a stall collar to prevent flow-back; and, (4) a new cement head for inducting any number of cementing plugs into the casing flow stream under pressure. Full-bore opening through casing string is obtained by pressure ejecting the float-in assembly from the shoe, after it has floated the well pipe to position in the drilled hole. Flow pattern of the flow stream conforms to the contours of the casing bore to eliminate jetting action, centrally within the casing stream. Elimination of jet prevents development of the slurry mud-ball mixture within the casing. Back-pressure valve is a full-closure, piston-like unit, made to seal and lock in nonretractable position in the venturi tube of the stall collar. This piston valve is conveyed to the stall collar by the top plug, following the slurry. Collapsible cementing plug has "up" and "down" sealing lips on the lower sealing portion of the plug. The upper sealing portion also with "up" and "down" lips, supplies stabilization to the plug, thereby preventing "wobble" action while it is being pumped. Collapsible cementing plug has a hollow bore, having molded-in ferrules at both ends. When not used to convey the back-pressure valve, the upper ferrule is blanked off. Lower ferrule receives an ordinary cork to hold the water placed in the hollow bore of the plug before it is inserted in the cement head. Constricting the collapsible cementing plug through the cement head before it enters the casing flow stream ejects the cork from the plug. Fluid immediately returns to the bore of the plug after the constriction is passed. *Rector Well Equipment Co., Inc.*

IT'S NEW CHECK IT

(5) DRUM-TYPE DEAD-LINE ANCHOR. One model is attached to corner column of substructure and the other anchors to derrick corner pier. Both models are welded from steel plate which holds weight to a minimum and insures ample strength at all stress points. No cable clips are used and no sharp bends are allowed which would have a tendency to damage the line. To anchor the dead line, three turns are taken around the large-diameter drum before the line passes through the



bronze-lined form-fitting clamp. Drum functions much the same as a cathead. There is very little tension in the line at the clamp because of the snubbing action of the three wraps around the drum. A slack clamp is placed on the working side of the line which prevents uncoiling of the line on the drum when slack is thrown into the dead line. By removing the slack clamp and loosening the bronze-lined clamp, a new section of line may be pulled from the storage spool through the blocks without removing the line from the drum. *International Derrick & Equipment Co.*

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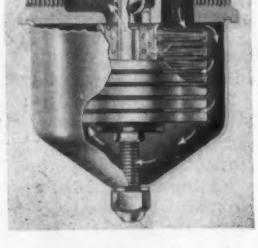
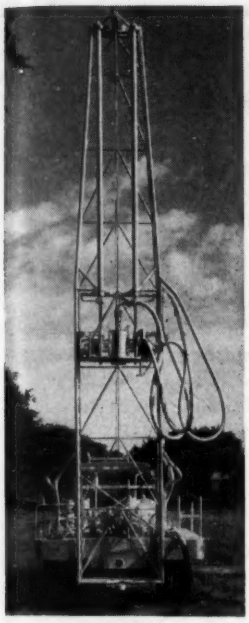


(6) NEW OIL FILTER assures full-flow filtration of lubricating, hydraulic, and fuel oils. Filter consists of individual filter disks which are stacked upon each other over a perforated tube. Each disk permits filtration on both sides, through extremely fine bronze-wire screen-cloth. Each filter disk also contains specially designed separators which not only provide necessary strength but channel the flow of the liquid radially into the center perforated tube. Standard models include a bypass valve, set at 15 psi. differential pressure. Quick disassembly and ease of cleaning the all-metal filter disks eliminate need for replacement parts. *Air-Maze Corp.*

IT'S NEW CHECK IT

(7) HYDRAULIC SEISMOGRAPH SHOT-HOLE DRILL (weighs only 11,300 lb. when mounted on a Ford truck) operates with 11-ft. continuous, nonchucking, hydraulically controlled stroke and drills a 10-ft. joint of N-rod



drill stem with each setting. The 10-ft. hydraulic cylinders are an integral part of the 22-ft. mast made of high-tensile alloy aircraft-steel tubing. Mast is the open-faced type and permits pulling of drill stem in doubles of 20-ft. sections. The floating rotary head is powered by two 15-hp. hydraulic motors and the Braden winch is also powered with a 15-hp. hydraulic motor. The two 15-hp. hydraulic pumps which drive the unit can be operated either in series or in parallel as desired, with a high-pressure booster pump supplying additional fluid for extreme power requirements. Drill is equipped with either a 4 by 5 or a 4½ by 6 Gardner-Denver mud pump. Speed of rotary table can be varied from a few revolutions per minute to several hundred without any loss of power or change in the torque applied to the bit. Rotary table is operated independently of the mud pumps, which can also be varied through a wide range of operating speeds by controlled hydraulic power. Drill rod can be raised or lowered in the hole for spudding operations, with variable speeds controlled hydraulically. Additional joints of drill stem can be added with the bit at the bottom hole position. *Century Geophysical Corp.*

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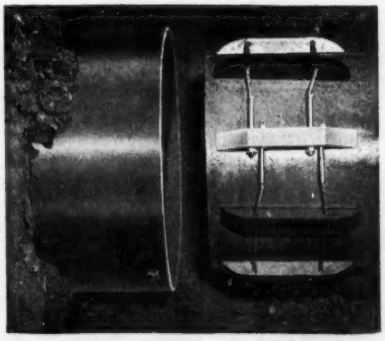
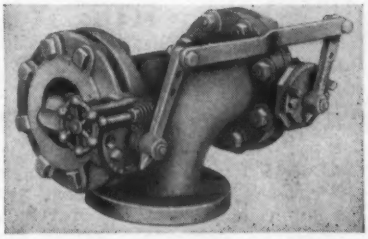


(8) PIPE-LINE CASING INSULATORS supports and guide the leading end of line pipe as it slides through the right-of-way casing. Additional casing insulators are spaced 20 to 30 ft. apart to speed up the job of installation by reducing friction, and to prevent contact between pipe and casing, permanently. Advantages obtained through use of insulator are: (1) prevent abrasive damage to pipe coatings; (2) insulate the line pipe from the casing for cathodic protection; (3) provide a reservoir beneath the pipe for water condensed within the casing. Installation is accomplished simply by wrapping each insulator around the pipe and tightening the cable-end studs. Pipe slides with less effort because insulator blocks act as skids to reduce friction between pipe and casing. *T. D. Williamson, Inc.*

IT'S NEW CHECK IT

(9) NEW THREE-WAY BUTTERFLY VALVE consists of two butterfly valves and a tee, with the valves interlocked so that the closing of one vane opens the other in any proportion. Low pressure drop and low maintenance are assured. Valve is ideally suited for quick interchange or diversion of flow or mixing of gases or fluids. The valve is available from 4 in to 60 in, American standard pipe flange sizes, in cast iron or special alloys. They can be built for pressures to 100 psi. and temperatures to 1,800° F. *W. S. Rockwell Co.*



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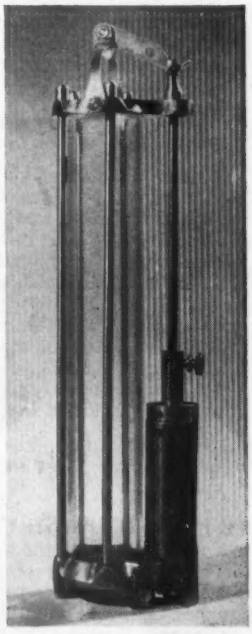
(10) OIL THIEF has transparent barrel for easy visual inspection and easy checking of specific gravity. All mechanism is operated by a single adjustable spring. Unit is easy to open because valve closes against two ball bearings. Thief can be tripped off bottom using only one line. Trip rod can be adjusted to close valve any specific distance (up to 8 in.) above bottom of tank. Valve is tripped by 8⅛-in. upward movement of the trip rod. This releases engaging jaw clutch and allows spring to close the valve. *Protek Specialty Co.*



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TRADE LITERATURE

IT'S NEW CHECK IT

(11) WIRE ROPE SOCKETS AND REFINERY FITTINGS. Series of four-page catalog sections covers rope sockets and refinery fittings. Dimension diagrams and tables included. Illustrated. *Chicago Steel Foundry Co.*

IT'S NEW CHECK IT

(12) MAINTENANCE PROBLEMS OF PETROLEUM INDUSTRY. New four-page analysis of maintenance prob-

lems found in the petroleum industry covers production, refineries, transportation, and marketing. Material suggests proper protective coatings for the many corrosive conditions found in each division of the industry. *Wilbur & Williams Co.*

IT'S NEW ✓ CHECK IT

(13) STEEL FLOOR PLATES. A 16-page booklet describes features, application, and sizes, of skidproof steel-floor plating. *Alan Wood Steel Co.*

IT'S NEW ✓ CHECK IT

(14) GAS REGULATORS for engines using gas fuel are covered in new eight-page two-color catalog. Information includes tables of regulator capacities, specific-gravity corrections, orifice and spring sizes, and list prices. Sectional illustrations show valve body and operating parts. *Universal Controls Corp.*

IT'S NEW ✓ CHECK IT

(15) ALL-METAL FLEXIBLE HOSE. A 36-page booklet contains complete information on all-metal flexible tubing. Specific applications are accompanied by tables of recommended sizes. Other tables show data on the many types. A variety of illustrations include typical assemblies for industrial use. *Titeflex, Inc.*

IT'S NEW ✓ CHECK IT

(16) PROTECTIVE CLOTHING. A 12-page catalog section pictures and describes both rubber and Koroseal (synthetic flexible material) garments. Included are the Koroseal industrial rain coat, acidproof apron, sleeve protectors, work suit, film industrial apron, and heavy-duty industrial apron. Rubberized products pictured and described include the economy work coat, general-purpose work coat, double-back industrial coat, universal work suit, Ameripol storm suit, dress rain coat, workers' leggings, work-n-weather hat, cyclone hat, Ameripol shop apron, laboratory apron, as well as rubber-canvas work gloves. *B. F. Goodrich Co.*

IT'S NEW ✓ CHECK IT

(17) FLUORCHEMISTRY IN PETROLEUM SCIENCE. Bulletin describes method of exploration analysis which depends upon fluorescent effects ultraviolet light produces when it strikes petroleum and petroleum-like substances. Material includes correlating sands, shales, and muds, and fluoroanalysis of drill pipe. *Ultraviolet Products, Inc.*

IT'S NEW ✓ CHECK IT

(18) MULTIPURPOSE LIFTING. New four-page bulletin scribes a multipurpose materials-handling unit built to solve all types of load-handling chores—hook, fork, and ram—with each function engineered as an integrated part of the complete machine. Specifications and application photographs included. *Silent Hoist & Crane Co., Inc.*

IT'S NEW ✓ CHECK IT

(19) STORAGE TANK PAINT. A 10-page report explains how Dulux Tank White for storage tanks reduces evaporation losses. Material emphasizes that paint provides maximum heat reflection. Field photographs included. Temperature data showing effect of white painting are given in table form. *E. I. Du Point De Nemours & Co. (Inc.), Finishes Division.*

IT'S NEW ✓ CHECK IT

(20) GEARS AND SPROCKETS. New pocket-size folder describes and illustrates custom-made gear products made from any choice of material. Rawhide and non-metallic gears and sprockets are also treated. *Frank Mathey Machine Works, Inc.*

IT'S NEW ✓ CHECK IT

(21) OIL-FIELD GENERATOR USE. How to apply packaged a.c. generators with seven handy tables for generator and wire selection is given in 16-page brochure. Contains diagrammatic index of generator swithgear. Oil and gas-field auxiliary electric power use explained. *Electric Machinery Mfg. Co.*

IT'S NEW ✓ CHECK IT

(22) PERSONAL SAFETY EQUIPMENT. New 40-page catalog describes and illustrates some 67 personal protective products for industrial safety. Helmets, face shields, goggles, respirators, and antisweat compounds are only a few of the products listed in the table of contents. *Willson Products, Inc.*

IT'S NEW ✓ CHECK IT

(23) ORIFICE METER SERVICE. New four-page, two-color, illustrated bulletin describes an orifice-meter chart integrating and computing service; a field and shop meter reconditioning and repair service; a new automatic bearing shaft lubricator; and the availability of several other special gas-measurement services. *John P. Squier.*

IT'S NEW ✓ CHECK IT

(24) GRAPHITE IRON PISTON RINGS. New 36-page catalog fully describes the complete line of manufacturer's graphitic iron piston rings for diesels and compressors. Details are given on ring design and construction, ring service, and ring specifications. Included are engineering tables, diagrams, and data as well as practical suggestions relative to the ordering of piston rings. *C. Lee Cook Manufacturing Co.*

The Oil and Gas Equipment Digest presents a review of what is new in equipment and trade literature . . . makes it possible for readers to obtain full information on every subject by use of convenient "Check It—Mail It" service card. This periodic feature of The Oil and Gas Journal will include all that is new in equipment . . . at a time when new products are being introduced, and existing products improved.

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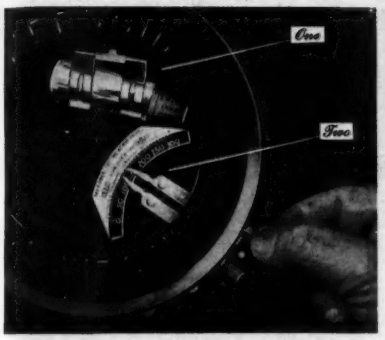

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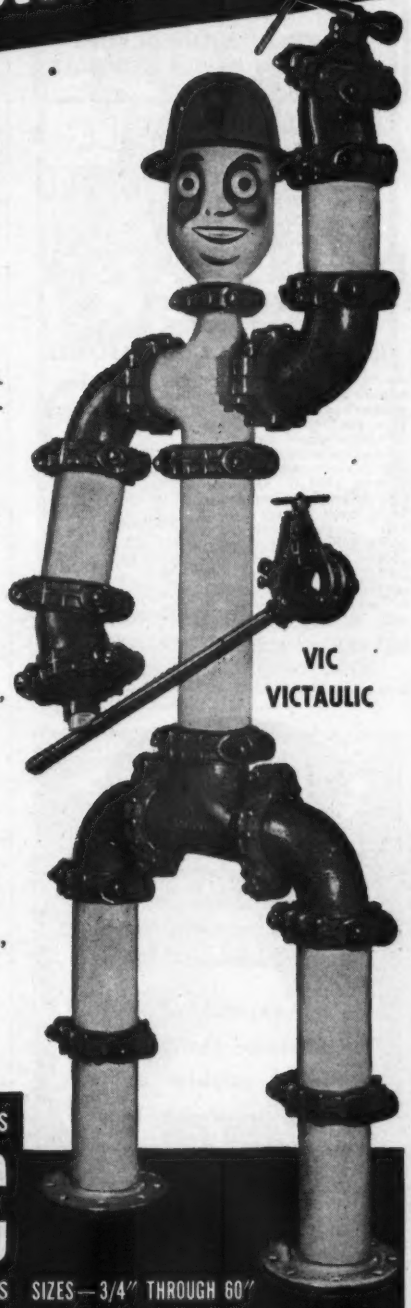

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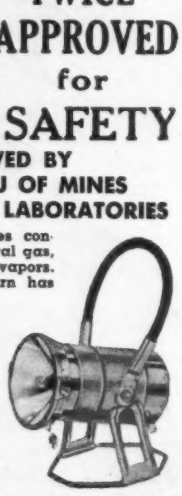

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REFINING

Carter Makes Billings Refinery Headquarters

Carter Oil Co. has transferred its headquarters for all manufacturing operations from Tulsa to Billings, Mont., effective February 1.

Simultaneously the company announced the appointment of Theodore R. Corbett as manager of the manufacturing department. For the past year and a half he has served as manager of the company's northwest division manufacturing department.

Carter operates refineries at Billings, and Cut Bank, Mont., and Newcastle and Lovell, Wyo. The company now has under construction a 20,000-bbl. refinery at Billings.

Ethyl Gasoline Marks Its Silver Anniversary

In the 25 years that Ethyl Gasoline has been on the market it has saved more than a billion gallons of gasoline, it was estimated by Charles F. Kettering, former research director of General Motors Corp., in marking the silver anniversary of the first sale of the new motor fuel on February 2.

He also recalled that in 1923, when he and his associates put the new product on the market, the country was being told it faced an oil shortage and one of their objectives was to produce a motor fuel which would give more miles per gallon as well as better antiknock performance. Since 1929, when sales records were first kept, Ethyl Corp. reported American motorists have used 60,600,000,000 gal. of Ethyl Gasoline and 250 billion gallons of regular or house brand gasoline containing Ethyl fluid.

Root Installing Facilities At El Dorado Refinery

New facilities and equipment for its topping unit are being installed by Root Petroleum Co. at El Dorado, Ark. Major items involved in the project include a heater and fractionating tower. The catalytic cracker at the Root refinery has a rated capacity of 6,000 bbl. daily.

Other figures on the plant's current operations show its crude oil capacity is 20,000 bbl. daily, its thermal cracking input 7,750 bbl. daily and its polymer gasoline production 560 bbl. daily.

Plans are under way to increase capacities of the polymer gasoline and catalytic cracking units at the refinery. The changes necessary to increase capacity of these two units are expected to be under way in April.

Stoll Now Completing West Point Terminal

Stoll Oil Refining Co., Louisville, Ky., is completing its terminal and ethyl blending plant at West Point, Ky.

Storage facilities at the terminal include four 1,000,000-gal. floating-roof gasoline tanks and a 10,000-bbl. kerosene tank. Plans are under way for increasing substantially current storage capacity at the terminal.

Danciger Moves Refining Division to Fort Worth

Danciger Oil & Refining Co. has transferred its refining division from Tulsa to Fort Worth, closing the Tulsa offices, and will concentrate on oil and gas production and contract drilling, according to Dan Danciger, president.

The company's 7,500-bbl. refinery at Longview, Tex., has been shut down for several years.

New Safety Record Set At Shell Refinery

The Wood River, Ill., refinery of Shell Oil Co., Inc., has made a record-breaking run for all Shell installations with a total of 3,476,721 injury-free man-hours of work.

The 164 days that Wood River's 3,800 employes recently worked without a lost-time injury helped to make possible the new production high of the refinery which was substantially above the plant's rated capacity, company officials said. More than 16,000,000 bbl. of oil were processed during the accident-free time.

Order Issued to Prohibit Tin Use in Lube Oil Cans

WASHINGTON. — Provided Congress enacts legislation extending government controls on tin, now due to expire February 29, use of tinplate, but not terneplate, for one-quart round refinery-sealed cans for lubricating oils will be prohibited after

that date, under a proposed order which has been issued by the Department of Commerce.

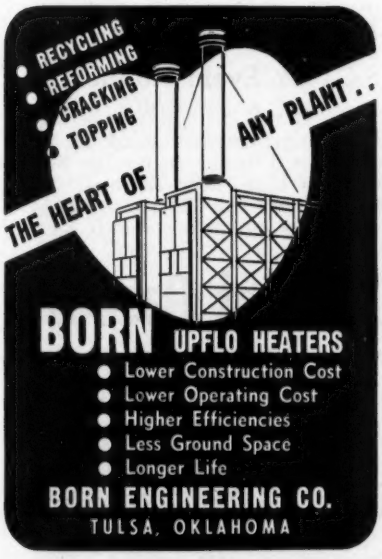
Restrictions imposed on use of the metal for various purposes will save approximately 2,750 tons of tin during 1948, if Congress permits the department to continue its conservation program, officials said.

Michigan Refinery Is Expanding

Producers Refining Co., Inc., West Branch, Mich., has plans under way for increasing its refinery asphalt charge to 1,500 bbl. daily. The major equipment involved in the expansion is to include a new vacuum tower and oxidizer. Current capacity of the refinery is given at 3,500 bbl. daily crude-oil charge.

Derby Completing Propane Unit

The propane recovery unit now under construction at the Wichita, Kans., refinery of Derby Oil Co., is scheduled for completion early in February. Other expansion plans for the refinery include a packaging plant for asphalt specialties.



New Synthetic Fiber Made From Petroleum Products

NEW YORK.—A new, completely synthetic-fiber known as Terylene was announced recently by two British firms, Imperial Chemical Industries, Ltd., and Calico Printers Association, Ltd. This product is a condensation of terephthalic acid and ethylene glycol, and appears to offer as many advantages for commercial and industrial applications as does nylon.

Terephthalic acid is a byproduct from petroleum residues in the preparation of phthalic anhydride.

Southwestern Oil Adding Catalytic Reforming Unit

Processing equipment at the Corpus Christi, Tex., refinery of Southwestern Oil & Refining Co. is being expanded to include a 5,000-bbl. daily catalytic reforming unit.

Engineering contractor on the project is Process Engineers, Inc.

Estimated to cost $800,000, the unit is scheduled for completion in August of this year.

Calumet Remodeling Plant

Calumet Refining Co. is remodeling distillation equipment at its Princeton, La., refinery. The refinery output currently consists of products including lubes and asphalts, from a crude-oil charge of 700 bbl. per day. Expansion plans for the refinery in 1948 include blending and compounding facilities, a new steam generating plant, and additional storage.

Taylor Aids A. & M. College

HOUSTON.—Taylor Refining Co., Corpus Christi, has donated a manually operated Podbeilniak low-temperature distillation column and lent a recording potentiometer to the chemical engineering department of Texas A. & M. College.

The distillation column is suitable for analyzing petroleum gases, and the potentiometer is a valuable addition to studies being made at the college, according to Dr. J. D. Lindsay, head of the department.

M.F.A. Oil Co. Plans Perco Unit

Construction of a Perco desulfurization unit during the year is incorporated in the 1948 expansion plans for the Chanute, Kans., refinery of the M. F. A. Oil Co. The refinery, a division of the M. F. A. Oil Co. of Columbia, Mo., has a current capacity rating of 1,800 bbl. daily crude-oil charge and 1,000 bbl. daily thermal cracking input.

NATURAL GAS

Texas Allowables for Sweet Gas Announced

AUSTIN.—Allowable production of sweet gas during February from 22 Texas fields has been fixed by the Texas Railroad Commission. Largest of the group was Carthage which was given an allowable of 546,686,552 cu. ft. daily.

Other allowables in cubic feet daily are:

North McFadden 21,517,241, Alief 6,000,000, Blue Lake 5,344,828, McCoy 7,413,793, Needville 14,482,758, North Louise 6,113,794, Old Ocean 219,367,-137, La Blanca 13,405,173, LaSal Vieja 1,724,139, McAllen 18,965,518, Riverside 3,925,861, Rooke 15,741,034, South Weslaco 31,853,448, Navarro Crossing 11,717,586, Oakwood 4,521,-724, Rodessa 23,521,207, Tri-Cities 20,-094,828, Waskom 5,336,896, Whelan 90,689,655, Sipes Springs (high pressure) 3,660,862, and Eden 2,068,966.

Philadelphia Gas Works Seeks Emergency Gas

Philadelphia Gas Works Co. has filed an application with the Federal Power Commission requesting an order directing Texas Eastern Transmission Corp. to make emergency deliveries of gas, beginning February 9, in such amounts as may be available up to 10,000,000 cu. ft. per day. The gas would be used in its manufactured gas plant in Philadelphia to replace oil as an enriching element.

In an order of October 10, 1947, FPC approved delivery of gas by Texas Eastern to Philadelphia Gas Works prior to July 1, 1948, in such quantities as might be available over and above the quantities otherwise obligated under the order. At that time, Philadelphia Gas Works did not expect a need for natural gas before the fall of 1948.

T.G.T. Asks Approval Of Expansion Program

Tennessee Gas Transmission Co. has requested Federal Power Commission authority to construct facilities to increase the capacity of its natural-gas transmission system by 60,000,000 cu. ft. daily.

Construction cost has been estimated at $16,275,000.

Proposed facilities include 150 miles of 30-in. main-line loop addition of 10,000 hp. in compressor stations, and construction of 150 miles of lines to reach new sources of gas supply.

T.G.T. said construction would be started immediately upon authorization, with plans for early completion so that a substantial portion would be in service some time during the winter of 1948-49.

The T.G.T. application said the program would guarantee United Fuel Gas Co. and Hope Natural Gas Co. delivery of 50,000,000 and 35,-000,000 cu. ft. daily now under option to those companies and would enable T.G.T. to meet the expected demands of East Tennessee Natural Gas Co.

Natural Gas Marketed In 1946 Set Record

Marketed production of natural gas in 1946 was 4,030,605 million cubic feet, an increase of 3 per cent above the 1945 peak of 3,918,686 million, according to the Bureau of Mines.

Principal gains in output were recorded in Texas, Oklahoma, Kansas, and New Mexico. Principal declines were in California and Louisiana. The Appalachian region reversed its declining trend with a large increase.

The bureau estimated that approximately 4,903,688 million cubic feet were withdrawn from available reserves during 1946.

Canadian Natural-Gas Output Shows Increase

Production of natural gas in Canada during November averaged 182,-630,000 cu. ft. daily, a huge increase over the daily average October production of 137,457,000 cu. ft.

Production of crude oil during November averaged 22,195 bbl. daily, a drop from the October output of 22,-360 bbl. daily.

Gas Company Revenues Continue Upward Trend

Operating revenues of natural-gas companies reporting to the Federal Power Commission amounted to $57,-641,286 in November, a 13.2 per cent increase over the same month in 1946.

For the 12 months ending November 30, 1947, revenues totaled $653,-038,301, an increase of 14.8 per cent over the preceding 12-month period, the FPC said.

FPC to Get No Additional Funds for Gas Regulation

WASHINGTON.—The House appropriations committee last week slashed a proposed increase of $302,-000 in the Federal Power Commission budget for the fiscal year to begin July 1, and allowed it $4,049,550.

The increase granted was $131,550, which will permit only for continuing the commission at its present level of activities, with some money for salary increases.

During its hearings, the subcommittee in charge of the bill inquired closely into the sale of the Big Inch lines by the War Assets Administration, a matter with which the FPC had nothing to do, and to the financing of Texas Eastern Transmission Corp., the purchaser.

FPC Chairman Nelson Lee Smith explained the commission is concerned only with the economic phases of an application, and corporate financing is a matter within the jurisdiction of the Securities and Exchange Commission. The questioning apparently was based on newspaper reports that a Washington attorney and others who bought original stock in the company made large sums when the stock was split last year.

S.C.M.A. Event Planned

The annual "Hi-Jinks" meeting of the Southern California Meter Association will be held at the Rio Hondo Country Club, near Downey, Calif., February 28. An entertainment program will follow the annual dinner.

Natural Gasoline

Seeligson Gasoline Plant Is Placed in Operation

Three compressor units in the new Seeligson field gasoline plant have been placed in operation.

Construction of the first unit was begun in July 1947. For the first time in the industry, centrifugal compressors are being used for partial compression of the field's casinghead gas.

The new plant, in which 12 companies are participating, is being operated by Magnolia Petroleum Co. Plans call for construction later this year of a gas recycling system and the installation of additional processing facilities for the further recovery of liquid hydrocarbons from the casinghead and cycled gas in the field.

Trial of the Seeligson field case, determining the validity of a Texas Railroad Commission order to halt production in the field until the flaring of gas was stopped, is expected soon. (For details of the case and its implications, see The Oil and Gas Journal, January 15, page 44).

Among the

Drilling Contractors

Calvert & Willis Busy On Four Illinois Wells

Calvert & Willis, Inc., Olney, Ill., is currently active on four Illinois wells of their own—including two wildcats and two field wells. Calvert & Willis and Ashland Oil & Refining Co. B-1 Bemis, a wildcat in 8-3n-8e, Clay County, flowed 1,166 bbl. in first 24 hours after 2,000 gal. acid in McClosky, and has 17 ft. of Cypress pay behind the pipe.

Drilling is presently under way on three wells as follows: Calvert & Willis and Vincent J. Nolan 1 G. R. Moore, wildcat in 6-5s-7e, Hamilton County; Calvert & Willis 1 Biehl, 14-3n-8e, Richland County; and Calvert & Willis and Central Pipe Line Co. 1 Ulm, 17-1s-13w, Wabash County.

Record Attendance Mark For AAODC Directors Meet

Record attendance was recorded at the board of directors' meeting of the American Association of Oilwell Drilling Contractors held in Dallas in January. Contractors were represented by 32 directors from all over the United States.

At the meeting it was uanimously decided to accept Houston's invitation to play host to the eighth annual meeting which will be held some time in October. Also, it was announced that an additional man will be added to the association staff to contact with the membership regulary and to promote improved relationships within the drilling and producing industries.

Active Program for 1948

Special attention will be given during 1948 to reactivating and expanding district meetings in all regions having major concentrations of drilling contractors. The association's extension training program will be broadened, both from geographical and curriculum standpoints. About 2,000 men have already completed the mud-control course, which will be continued, but other courses will be added for men in the field. The mud-control work is being extended to California and classes will start there soon.

Directors present for the meeting included: J. E. Brantly, Dallas; A. H. Rowan, Fort Worth; Howard P. Holmes, Dallas; William T. Payne, Oklahoma City; J. E. Warren, Midland; E. C. Brown, Long Beach; Joe S. Morris, San Antonio; George F. McQueen, Fort Worth; D. B. Ferguson, Carmi, Ill.; Lester D. Cain, Houston; D. H. Graham, Long Beach; R. M. Olds, Mt. Carmel, Ill.; E. E. Pickering, Houston; C. J. Paine, Dallas.

J. Zeppa, Tyler; Louis A. Beecherl,

Daylight crew of Producers Drilling & Well Servicing Co., Oklahoma City, on Skelly Oil Co. 2 Dona Spears, Velma pool, Stephens County, Oklahoma. Pictured are C. M. Rains, driller; Robert Scott; G. T. Swanson; Glen Patterson, and Ror Baker

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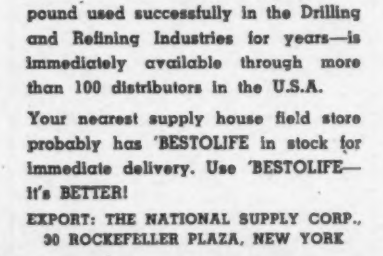

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Contractors Signed Up For Five Michigan Tests

Permits have been issued by the Michigan Department of Conservation for seven wildcats with contract tools slated to drill five of the tests. All but one of the wells are scheduled for the shallow southwestern district of the state. The exception, which will be drilled by Union Rotary Corp., Mt. Pleasant, is Gulf Refining Co. 1 Anna L. Alderman, SW NW NE 2-21n-6w, a basin district test located 1 mile south of Aetna Dundee field, Missaukee County.

Max Spiedel, Allegan, will drill two of the shallow tests—both in Allegan County—as follows: Louis Zellman 1 Adelbert and Lucy Canfield, SE NW NE 26-1n-14w; and Louis Zellman 1 Darle J. and N. M. Luikins, SE SW SW 19-2n-11w. Harry Stroud, Allegan, is the contractor for Leonard C. Sleep 1 Henry Wever, SE SE SE 19-4n-13w, Allegan County. Elkin Palmer & Son will drill Ford Oil Co. 1 John Hutty, NW NW NW 35-4n-13w, Allegan County.

Corwin Drilling Co. will drill Frank and von Glahn 1 Indian, wildcat in Cuyama area, San Luis Obispo County, California.

Sam Murphy, Wichita, has drilled in a pool opener for Nadel and Gussman, their 1 Marcotte, NW NW SW 26-9s-20w, southwestern Rooks County, Kansas. Discovery is 3 miles northeast of Palco pool and 3 miles southwest of Glick pool. It swabbed 92 bbl. in 1 hour from Arbuckle at 3,812-14 ft. Murphy has an offset lease and is expected to start shortly on offset wells.

Woods Drilling Co., New Orleans, has three wells under way in Northwest Iconium pool, Logan County, which Woods recently discovered. Wells are 2, 3, and 4 Crabtree, located in SW, NE, and SE quarters of NE NW 4-16n-1e.

Hoyt Drilling Co., Long Beach, will make hole for Amerada Petroleum Corp. at its Irvine B-58-7, West Newport field, California.

Mallard Drilling Co., Wichita, and Westgate-Greenland Oil Co. have marked up an oiler in McPherson County, Kansas, with its 1 Burk, NW NE SE 7-18-1, 1 mile south of Hoffsommer pool.

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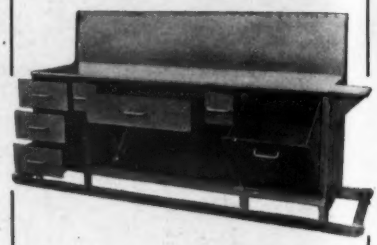

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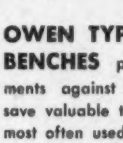

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HOUSTON

PIPE LINES

Contract Awarded for Jal-Midland 20-in.

Contract for the construction of 90 miles of 20-in. pipe line from Jal, N. M., to Midland, Tex., has been awarded to Morrison Brothers Construction Co., Inc., Odessa, Tex., according to R. B. McLaughlin, president of Texas Pipe Line Co.

This contract covers a section of the Jal-Cushing, Okla., 20-22-24-in. pipe-line project, which will be owned on an undivided interest basis by Texas Pipe Line Co. Shell Pipe Line Corp., Empire Pipeline Co., and Sinclair Refining Co.

The 22-in. section of line from Midland to Wichita Falls is now being constructed under contract previously awarded to Latex Construction Co.

Stanolind Lets Contract For 16-In. River Crossings

Stanolind Pipe Line Co. let contract last week to R. H. Fulton & Co. for the laying of two Somastic-coated river crossings to be laid prior to the building of 265 miles of 16-in. looping this summer along the Slaughter-Drumright 16-in. line.

The two 16-in. river crossings to be built by Fulton are for 1,800 ft. at Pease River and 5,500 ft. at the Salt Fork of the Red River in Texas. Two additional river crossings will be contracted after the spring rains.

Stanolind completed the construction of 367 miles of new 20 and 22-in. pipe line in 1947, together with the building of six new pump stations, rehabilitation of five pump units and the installation of additional pumping units at three main line pump stations.

Its crude-oil gathering systems were extended during the year by the laying of 302 miles of 3, 4, 6, and 8-in. lines in Oklahoma, Kansas, Texas, New Mexico and Wyoming.

As a result the Stanolind Pipe Line Co. had at the start of 1948 approximately 10,000 miles of gathering and trunk lines. During 1947 these lines transported approximately 11,560,623 bbl. of oil, which is an average daily delivery of 305,646 bbl.

The expansion program in 1948 has scheduled for construction 130 miles of 8-in., 138 miles of 12-in., 465 miles of 16-in., and 116 miles of 20-in., and during 1949 there is scheduled for building 69 miles of 12-in. and 70 miles of 16-in. pipe line.

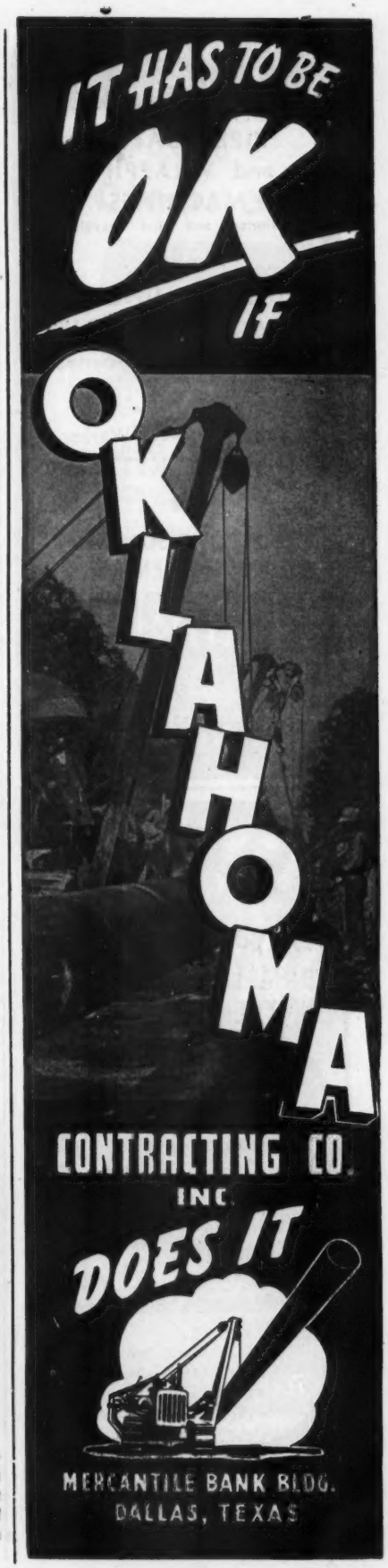
Northern Natural Adds New Compressor Units

Northern Natural Gas Co. added compressor units during 1947 totaling 32,400 hp. at 11 stations including the new stations at Sunray, Tex., and Welcome, Minn. Lateral lines, loops and extensions laid last year by the company totaled 198.48 miles of pipe in diameters from 4½ in. to 20 in.

The two new stations and the additions to the other stations constructed in 1947 increased the capacity of the Northern Natural system north of the Clifton, Kans., station from 325,000,000 to 390,000,000 cu. ft.

Northern Natural plans for 1948 are

Operating personnel at Little Rock, Ark., 20-in. station equipped with centrifugal compressors by Texas Eastern Transmission Corp. owners of the Big Inch lines. Texas Eastern employes in the group were formerly with War Emergency Pipelines, Inc. Left to right are Kemmi Ray Wood; Samuel L. Webb; Jeff Hughey; W. R. Coller, station chief; and L. H. McClure, all employes of Texas Eastern; and H. W. Cox, pipe fitter specialist, Brown and Root, Inc.



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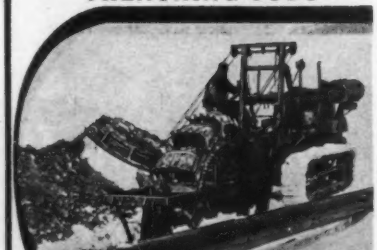

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being revised. It is reported that they include the construction of two new field stations to have 1,600-hp. and 300-hp. units and the addition of compressor units in six stations aggregating 12,600 hp. Pipe-line construction this year will depend on the prospects for pipe deliveries.

During 1947 the construction of lines of the larger diameters included the following: 6.51 miles of 12¾-in.; 42.44 miles of 16-in.; 40.41 miles of 18-in. and 37.10 miles of 20-in.

Southern Phillips Merges With Southern Pipe Line

Southern Phillips Corp. has merged with Southern Pipe Line Corp. The merger became effective January 29. The stock of Phillips Petroleum Co. in Southern Phillips was acquired by the stockholders of Southern Pipe Line Corp.

Pipe-line facilities formerly operated by Southern Phillips have been taken over and will be operated by Southern Pipe Line, according to Maston Nixon, president of Southern Phillips and executive vice president of Southern Pipe Line.

As of December 31 Southern Phillips sold to Southwest Texas Pipe Line Co., a wholly owned subsidiary of Phillips Petroleum Co., gathering lines in Turkey Creek field that served the leases of Phillips Petroleum Co.

Techint Contracts Section Of Argentine Gas Line

Construction of the southern section of 1,100-mile, 10-in. Comodoro Rivadavia-Buenos Aires, Argentina, natural-gas line, being built by Direccion General del Gas del Estado has been contracted by Compania Tecnica International, known as "Techint," headed by Dr. Francisco Indaco. Techint operations are to be underway this year.

Construction is now in progress at the northern end of the line where it has recently been reported that a spread operated by the construction organization of Direccion General del Gas del Estado laid 50 miles in 40 days.

Virgil Stark, president, North American Utility & Construction Corp., New York, has announced that contracts for equipment have been made by the Argentine Government for 530 miles of the 1,100-mile project scheduled for construction by Societe Anonima de Obras Publicas and Compania Tecnica International.

Compressor stations are to be located 310 miles apart. Compressor units are reported to have been ordered from Clark Brothers, Inc. Ferrault Brothers are furnishing equipment for applying pipe protection materials. Orders for a third of

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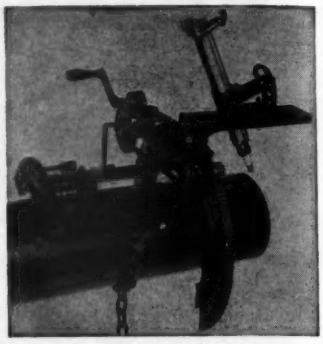

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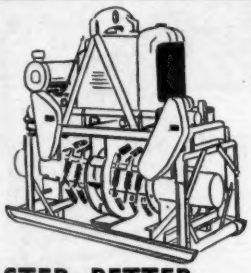

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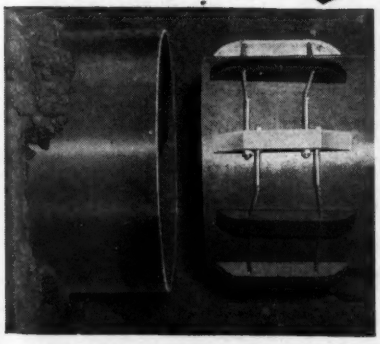

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the pipe for the project are said to have been placed with an Argentine affiliate of American Rolling Mills Co. A large part of the pipe is reported as made in Italy from billets purchased in the United States.

Oil-Filled Pipe Line Holds Electric Cables

A NEW application of pipe-line facilities is exemplified in installations recently completed at San Antonio, Tex., where a system extending for several miles has been laid with pipe filled with dielectric oil maintained at 200 psi., insulating three 138,000-volt cables.

The new system connects San Antonio's steam-turbine power plant to the outlying Olmos and Grandview substations. These two circuits are approximately 7½ and 3¼ miles long, respectively, the Olmos line being among the world's longest.

This type of installation consists of three insulated cables contained in an oil-filled 5-in. pipe. The pipe was shipped to San Antonio in 40-ft. lengths, which were welded.

The pipe laying progressed by segments of welded pipe up to 1,770 ft. long. When such a segment was completed, it was pressure tested for leaks and dried. Cables were then pulled through by winches, and the section was filled with oil.

The line used for pulling the cable through the pipe was blown through by an air compressor unit. In the past, a wire has been pushed through each 40-ft. length of pipe and spliced to the preceding segment before the pipe was welded. The new method used at San Antonio enabled engineers to pull cable into continuous lengths of pipe up to one-third of a mile long.

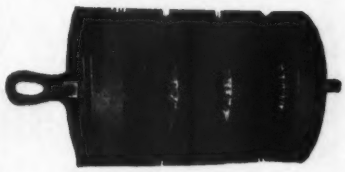
Five 10,000-gal. tank cars of oil were shipped to Texas from the G.E. works at Schenectady. The special insulating oil was pumped into decontaminated and dried tank cars, and an atmosphere of nitrogen was placed on top of the oil to seal it from the air. This was the first time that insulating oil had been shipped under a controlled gas-pressure seal.

The complete San Antonio line was filled with this oil and held at a nominal pressure of 200 psi. by a permanent pumping unit installed at the power plant ends of the two lines.

Trans-Arabian Plans Confirmed

Plans of Trans-Arabian Pipe Line Co. to proceed with the construction of the 1,040-mile Trans-Arabian pipe line have been confirmed by B. E. Hull, president. (For details, see The Oil and Gas Journal, January 22, page 44.)

MOLE Pipeline Cleaner



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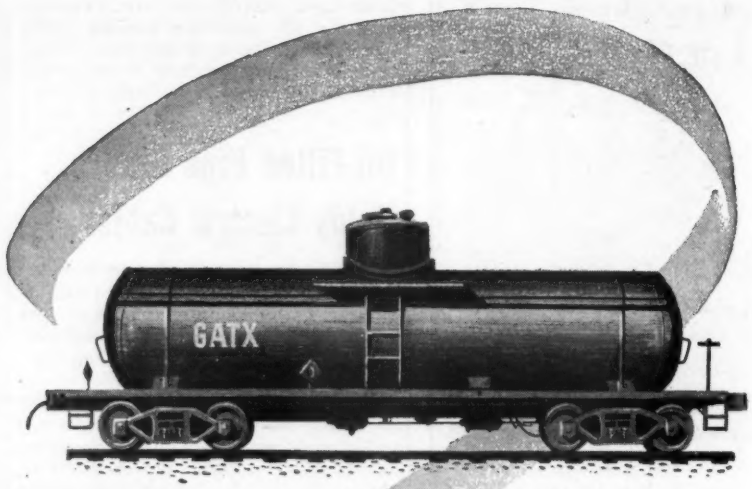

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Exploration and Drilling

Wyoming's Powder River Basin in the Limelight

THE TEXAS CO. 1 Unit, NW NE 2-52n-72w, near Adon, in Campbell County, Wyoming, near the middle and deepest part of the Powder River basin, is an oil well. Meantime, in the Mush Creek area of southeastern Weston County, Wyoming, big wells are being found. These events reinforce each other to add up to an intense interest in the Powder River basin.

This geological basin covers about 32,000 sq. miles in northeastern Wyoming and southeastern Montana. In the deeper parts, the thickness of the sedimentary column has been estimated at around 16,000 ft. Around the rim of the basin, a few structural accumulations of oil have been found, although there have been many disappointments in tests of rim structures. But, one of these rim producers was Salt Creek, the great granddaddy of all Rocky Mountain fields found to date. Of the other rim structural accumulations, only Lance Creek and Big Muddy have amounted to a great deal.

The eastern rim of the basin pinches out against the Black Hills uplift, and theoretically should provide an attractive place to search for stratigraphic trap fields. However, until recent months, only the old Osage field of Weston County ever amounted to anything.

The Texas Co. discovery in the middle part of the basin is on a long narrow structure, and was drilled into the Madison lime to 9,945 ft. before backing up to complete in the present producing horizon, a Pennsylvanian sand probably equivalent to the Tensleep or Minnelusa. The test ran fairly consistently about 3,000 to 4,000 ft. higher in the Pennsylvanian than many geologists had estimated. While an estimate of the thickening of sediments basinward is always subject to a margin of error, the difference here is pretty good evidence that the local structure is thrust upward a long way from the normal basin floor, and is considerably more than a minor wrinkle.

The well swabbed around 100 bbl. of 27°-gravity oil per day from a sand pay at 8,990-9,007 ft. It was hard to figure out from drill-stem tests, samples, and log determinations, just where the oil-water contact line was. A squeeze job seemed to have cemented off part of the pay, and with some difficulty and a great deal of delicate maneuvering, a 26-qt. shot of nitroglycerin was set off, without collapsing casing or ruining the hole.

Exploration men will recognize some of the problems faced and the difficult decisions made. With every scrap of information correlated, there are still many questions about the pay zone that have not been answered definitely. Trying to pin down the pay zone in new territory with only general long-distance correlations available is tricky business at best. Setting off even a light shot in a 9,000-ft. hole that has already cost a lot of money is not a decision to be made without causing somebody a sleepless night or two.

The next test to watch is the Pure Oil Co. 1 Unit, center of Lot 9, 34-56½n-69w, near Rocky Point, in northern Campbell County, near the Montana line. This is on the rim of the Powder River basin.

HIGHLIGHTS OF WEEK'S DEVELOPMENTS

TEXAS GULF COAST.—A major northeast extension in the Gilbert Ranch area of Jefferson County has been completed at Meredith, Clegg & Hunt 1 Gilbert. Initial production was 72 bbl. of 59.1°-gravity condensate through a ¼-in. choke, with 2,680,000 cu. ft. of gas, through perforations at 8,685-91 ft.

ROCKY MOUNTAIN.—Husky Refining Co. has a probable new pay in the Pitchfork field, Park County, Wyoming. Stanolind will drill a Torchlight test to the Madison, and Seaboard finds water in the Madison at the Silver Tip wildcat west of Elk Basin field. Utah's deepest test is now being whipstocked and redrilled by Pacific Western. Byrd-Frost, Western Natural et al found gas at Boundary Butte, in the San Juan basin, Utah.

WEST TEXAS.—Southwest Ector County confirmation well has logged 194 ft. of oil pay. In north-central Reagan County, Gulf Oil Corp. 1-E-A Hattie Connell was a failure in the Ellenburger but made a completion potential of 839 bbl. of oil from the Silurian above plugged-back depth of 8,375 ft.

CANADA.—Encouraging production tests at Imperial-Woodbend 1, LSD 5, 15-51-26w4, indicate similarity to Leduc field, 3½ miles to southeast.

NORTH LOUISIANA.—Catahoula Parish wildcat flows 250 bbl. of oil on preliminary tests. Bienville Parish test northeast of Bear Creek field has a large flow of gas.

NORTH CENTRAL TEXAS.—Continental Oil Co. opens a large conglomerate field in northwestern Montague County. The well flowed 248 bbl. of oil in 7 hours from perforations at 6,190-6,204 ft.

CALIFORNIA.—Seaboard Oil Co. confirms the importance of its new field with the successful completion of its third well in Section 21-28s-20e, Bacon Hills area of Kern County.

SOUTH LOUISIANA

Continental Opens New St. Martinville Sand

NEW ORLEANS.—A new sand for St. Martinville pool in St. Martin Parish has been opened by Continental Oil Co. 7-A Conoco fee, 57-11s-6e, Drilled to a total depth of 5,649 ft., this well flowed an initial production of 95 bbl. of 25.7°-gravity oil daily with a gas ratio of 238. Production is through perforations at 4,000-12 ft.

Kenneth Meredith 2 South Coast Corp. has opened new producing level at Raceland pool, Lafourche Parish. Total depth is 10,200 ft., with 5½-in. pipe cemented on bottom. On potential gage the well flowed 150 bbl. of 50°-gravity condensate daily through an 8/64-in. choke with 3,150 psi. flowing pressure on the tubing and a gas ratio. of 4,000. Production is through perforations at 10,085-91 ft.

Production gage has been made for Magnolia Petroleum Co. 1 Four C. McPherson, discovery well in Beauregard Parish, 5 miles east of Longville townsite. Pipe was perforated from 8,414-19 ft. and the well flowed at the rate of 120 bbl. of 43.8°-gravity oil per day through ¼-in. and 6/64-in. chokes. Gas gage was 109,000 cu. ft. per day, ratio 878. Flowing pressure on tubing was 1,150 psi. Total depth is 9,096 ft., with 5½-in. casing cemented at 9,003 ft.

The Texas Co. continues to make tests in its potential discovery in the extreme western portion of Cameron Parish on the east side of Sabine Lake. The 1 State Willow Bayou Lease 790, was drilled to a total depth of 12,285 ft. Last week the well flowed at the rate of 96 bbl. of oil per day through a 12/64-in. choke. Perforations are being squeezed and a new test will be made.

The Texas Co. attempted to get production from a third level in its discovery well 6½ miles northeast of Krotz Springs field and in Pointe Coupee Parish. The 1 Lottie Land & Development Co. is located in 25-6s-8e, 3 miles west of Lottie townsite. A test was attempted at 8,859 ft. and the well failed to flow. Operators were still attempting to get a flow at last report. An initial test, perforations at 10,188-228 ft., flowed at the rate of 225 bbl. of 53°-gravity condensate daily through a 10/64-in. choke, and a second test through perforations at 9,097-9,116 ft. flowed at the rate of 165 bbl. of 48.5°-gravity oil per day along with 4,000,000 cu. ft. of gas per day through a ¼-in. choke. This is the first commercial production for the parish.

SOUTH LOUISIANA SUCCESSFUL WILDCAT

St. Martin Parish: New oil sand St, Martinville pool—Continental Oil Co. 7-A Conoco fee, 57-11s-6e, TD 5,649 ft., top sand 4,000 ft., perf. 4,000-12 ft. IP: 95 bbl. oil per day through 8/64-in. choke, gas-oil ratio 238, 25.7° gravity, no water, TP 450 psi.

SOUTH LOUISIANA WILDCAT FAILURES (Week Ended January 24)

Allen Parish: Bel Oil Corp. 1 Amos Richard, 21-6s-4w, 5 mi. W of North Elton field, dry, TD 8,432 ft.

Cameron Parish: H. L. Hunt 1 Homer & Adam Hebert, 18-12s-8w, ¾ mi. NE of Big Lake producing limits, dry, TD 9,746 ft.

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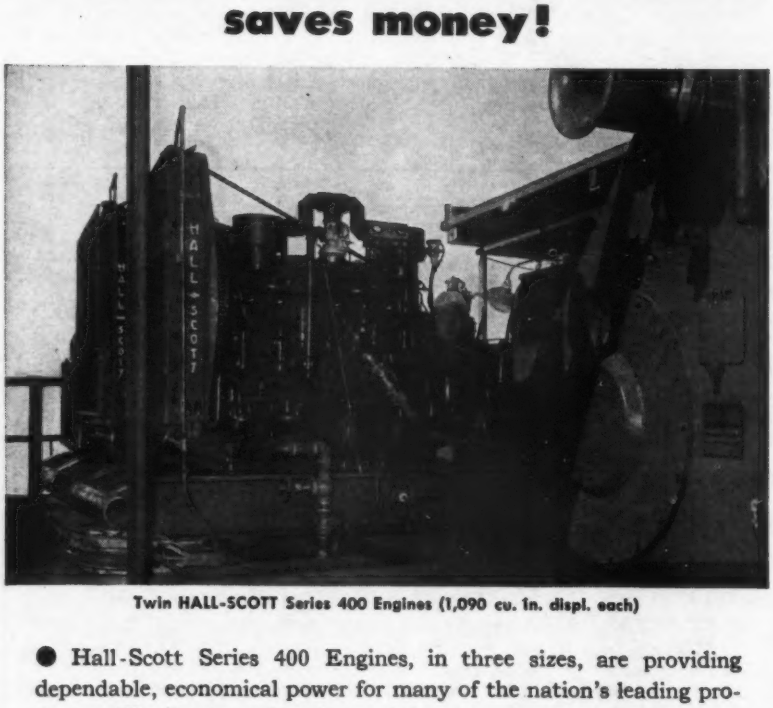

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APPALACHIAN FIELD

New Penn Test Gets No Shows, Shuts Down

PITTSBURGH.—On Chestnut Ridge near the state line in Springhill Township, Fayette County, southwest Pennsylvania, New Penn Development Co. et al topped the Oriskany sand at 7,875 ft. in the wildcat on Paul E. Dunham farm which from a surface elevation of 2,300 ft. places it datum minus 5,555 ft. At 7,965 ft. it was shut down with no showing of gas from the Onondaga chert nor the Oriskany sand but it will not be plugged until drilling has been completed on two other tests in the area. In Georges Township, Fayette County, Orville Eberly et al topped the Oriskany sand at 7,093 ft. in the test on Albert J. Opperman farm or at dautm minus 4,735 ft. The Onondaga chert gas gages 1,343,000 cu. ft. at 7,123 ft. or 30 ft. in the Oriskany with no additional gas from the sand.

In Shade Township, Somerset County, Peoples Natural Gas Co. is now rigging up to deepen the wildcat No. 1 R. F. Grove from 5,200 ft. to the Oriskany sand. It will be the first deep test to the lower Devonian in the area.

In Lincoln County, United Fuel Gas Co. completed a good Salt sand gas well in 6,248 fee, Mineral, with a final gage of 1,107,000 cu. ft. from a total depth of 767 ft.

In Harvey district, Mingo County, United Carbon Co. completed a large Big Lime gas well in 1,218 Cotiga Development Co. which gaged, initial, 4,000,000 cu. ft. but blew down to 1,459,000 cu. ft., total depth 2,363 ft. It will be acidized.

SOUTHWEST PENNSYLVANIA WILDCAT FAILURE

Washington County, Somerset Township: Furman Nuss et al 1 Pittsburgh Coal Co., dry, through 5th sand, TD 2,692 ft.

(Week Ended January 24)

Fayette County, Springhill Township: Peoples Natural Gas Co. 1 George Steve, Onondaga chert 8,008-8,177 ft., gas 8,052 ft., shot twice 8,017-77 ft., TD 8,788 ft.

WEST VIRGINIA SUCCESSFUL WILDCATS

Jackson County, Ravenswood district: Columbian Carbon Co. 984 Blanche Ash-

craft, 759,000 cu. ft. gas, elev. 615 ft., Corniferous lime 4,378 ft., Oriskany sand 4,470-90 ft., shot 4,470-90 ft., rock pressure 1,200 psi. 48 hours, TD 4,550 ft.

Nicholas County, Jefferson district: Columbian Carbon Co. 1 Leah Frank et al, 964,000 cu. ft. gas, Injun sand, TD 2,057 ft.

Wirt County, Jefferson district: Glen W. Roberts 1 W. R. Munday, 202,000 cu. ft. gas, Squaw sand, TD 2,300 ft.

WEST VIRGINIA WILDCAT FAILURES

Mason County, Graham district: New Haven Gas Co. 1 H. R. Fry, dry, Berea, TD 1,719 ft.

Nicholas County, Jefferson district: Howard Bartlett 1 J. A. Kuntz, dry, Injun sand, TD 1,702 ft.

TEXAS GULF COAST

Calhoun County Gets New Discovery Well

HOUSTON.—Discovery of a new Calhoun County oil field 3½ miles northeast of Ryan Consolidated and Fullerton Oil's recent discovery, is indicated at C. G. Glasscock 1 McDonald, in I&GN Sur. 6, Abstract 95. This test was drilled to 7,304 ft., with casing set around 7,277 ft. for completion, On a 20-minute drill-stem test, the well recovered 2,000 ft. of 41.4°-gravity oil through a ¼-in. choke.

A major northeast extension has been completed in the Gilbert Ranch area of Jefferson County by Meredith, Clegg & Hunt. The 1 H. N. Gilbert, in John Ricord Survey, 3,850 ft. northeast of the field, was completed for an initial production of 72 bbl. of 59.1°-gravity condensate per day through a ¼-in. choke, along with 2,680,000 cu. ft. of gas. Open flow gas potential was 59,000,000 cu. ft. gas daily, tubing pressure 2,800 psi., while shut-in pressure was 2,980 psi. Production is through perforations at 8,685-91 ft.

Holly Development Co. 1 George Stanchos, a prospective new field opener, approximately 4½ miles west of Meyersville and just north of the extreme north corner of Goliad County, in DeWitt County. On drill-stem test at 7,599-7,604 ft. in the Wilcox zone, developed 525 psi. working pressure in 15 minutes through ¼-in. chokes top and bottom, and recovered 240 ft. of 35.7°-gravity oil, bottom-hole pressure 3,400 psi. flowing. Drill-stem test at 7,604-08 ft., through same chokes and open 20 minutes, developed 160 psi. working pressure in 15 minutes and 210 psi. in 20 minutes, flowed pipe-line oil, recovering 56 stands of oil and 28 stands of mud, no water, bottom-hole pressure 3,200 psi. Operators are now preparing to perforate for completion after setting 5½-in. casing on bottom at total depth of 7,608 ft.

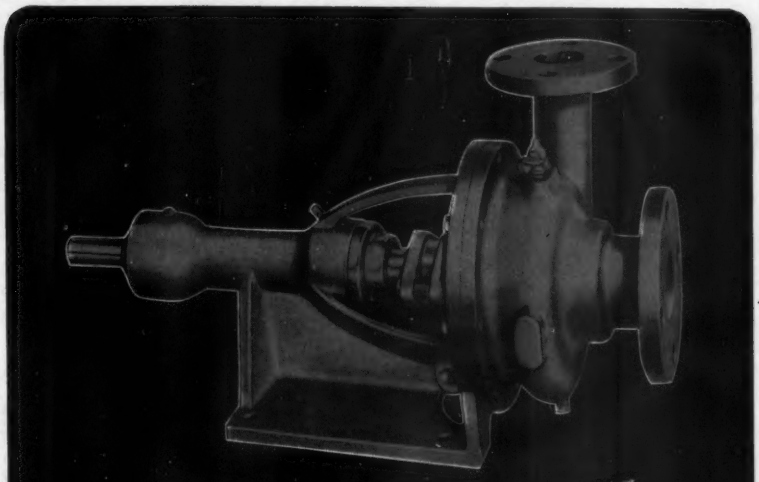
Houston Oil Co. of Texas and American Republics Corp. 2 Rice Institute, new Wilcox oil discovery in Hardin County, on potential test, flowed 135 bbl. of 35.5°-gravity oil in 24 hours through a 15/64-in. choke with 600 psi. flowing pressure on the tubing. Production is through perforations at 9,025-37 ft. Total depth is 10,636 ft., with 5½-in. casing cemented at 9,805 ft. This well is 7,500 ft. west-southwest of production in Village Mills field.

TEXAS GULF COAST (DISTRICT 2) WILDCAT FAILURES

Gonzales County: Phillips Pet. Co. 1 Hunt (Ella Hunt Davis et al unit), in Adam Zumwalt, Jr., Lge., 6 mi. N NW of Flatonia, near Fayette County line, in Arnim field area, dry, TD 3,530 ft.

Refugio County: Anderson & Kirkwood et al 1 Lizzie Wotipka, in Johnson & Pugh Subd. of Bonnie View Ranch, in Antonio de la Vina Grant, 2 mi. SE of Woodsboro and 1 mi. N of Wyrick field, dry, TD 6,992 ft.

Victoria County: Taylor Refg. Co. 1 L. W.



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Ampco Metal makes the difference. The pumps are of the heavy-duty industrial type. They are soundly designed for mechanical durability, high efficiency, and ease of servicing. The paramount feature, however, is the material used in their construction; namely, *all aluminum bronze* as produced in Ampco Metal's laboratory-controlled foundry. These time-proven aluminum bronzes make possible the pumping of such liquids as sulphuric acid, acetic acid, mine water, brines, oils, solvents, beer, food process liquors, etc. Not only are the pump parts in immediate contact with the liquid made of aluminum bronze, but supporting members subject to seepage and spray, such as pedestal, shaft, and sleeve, also are made of this corrosion-resistant material.

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Placement Manager

Marathon Corporation

Menasha, Wisconsin

Stolz, in Abraham Temple Sur., 4 mi. E of Victoria, dry, TD 5,304 ft.

(Week Ended January 24)

Bee County: H. L. Hunt 1 T. H. Heard, in Washington Stevens Sur., 8 mi. E-NE of Beeville, dry, TD 4,217 ft.

Calhoun County: The Texas Co. 1 State of mi. S of Matagorda Bay field, 2 mi. N of Port O'Connor, and approx. 1½ mi. NE of the shore line, dry, TD 5,950 ft.

Gonzales County: K. D. Owen & Baldridge & King 1 A. B. Hopkins et al, in James Gibson Sur. 3, 4 mi. E of Waelder townsite, dry, TD 2,335 ft.

Live Oak County: H. L. Bedwell 1 Alamo Lbr. Co., in R. H. Brown Sur. 403, dry, TD 1,832 ft.

Dirks & Wood 1 Frank E. Bliss, H&GN RR Sur. 1, 3½ mi. W of Cadiz and 3 mi. N of La Para, dry, TD 4,213 ft.

Refugio County: P. R. Rutherford et al 2 J. F. Welder Hrs., in Jas. Powder and Jas. Hewitson Sur., 3½ mi. N of Greta field, dry, TD 6,409 ft.

Victoria County: Fidelity Oil & Royalty Co. 1 Herman Dietzel, in Rafeal Manchola Gt., ¾ mi. W of West Pridham Lake field, and ¾ mi. NE of Coletto Creek field, dry, TD 5,006 ft.

Texana Pet. Co. 1 Gertie Van Zant Munlin, in Polita Castillo Sur., 1½ mi. NW of Bloomington and ¾ mi. NW of Bloomington field, dry, TD 5,002 ft.

TEXAS GULF COAST SUCCESSFUL WILDCATS (DISTRICT 3)

Chambers County: New oil sand Jerkins pool—The Texas Co. 2 Annie Schilling, in S. Smith Sur., TD 6,550 ft., top sand 6,380 ft., perf. 6,395-99 ft. in Marginulina, IP: 183 bbl. oil per day through 9/64-in. choke, GOR 727, TP 990 psi., 36.1° gravity, 0.4 per cent water.

Wharton County: New gas sand Twin Basin pool—Floyd L. Karsten 1 W. T. Ellis, ETRR Sur., Sec. 23, 5 mi. S of Pierce, TD 7,154 ft., top sand 6,586 ft., perf. 6,586-97 ft. IP: flowed dry gas and shut in, no gage, TP 2,250 psi., CP 2,300 psi., shut-in pressure 2,450 psi., no water. No field outlet.

TEXAS (DISTRICT 3) WILDCAT FAILURES

Brazoria County: W. E. Allaun 1 Geo. I. Dimmick & Julia V. Adams, in HT&B Sur., Sec. 40, 6 mi. NE of Rosharon townsite, 4 mi. E of Sandy Point field production, dry, TD 2,009 ft.

Holmes Drlg. Co., C. W. Vick & Claud Hamill 1 Dr. B. W. Turner et al, in S. F. Austin Sur. 8, 2 mi. S SW of Bonney townsite, dry, TD 9,506 ft.

Fort Bend County: Coast Co. 1 W. J. Walker, in Enoch Latham Sur., ½ mi. SE of Fulshear townsite, 4½ mi. S of Katy field gas production, dry, TD 8,010 ft.

Galveston County: H. L. Hunt 1 Ervine & Bishop, in Alex. Farmer Lge., 1 mi. off southwest side of Dickinson - Gillock production, dry, TD 10,015 ft.

Grimes County: Seminole Oil & Gas Corp. 1-A J. E. Quinn, in S. F. Austin Lge., Yarboro area, 8 mi. SE of Navasota, dry, TD 7,518 ft.

Trinity County: Continental Oil Co. 1 R. E. Holcombe, J. W. Bowman Sur., 10.5 mi. N of Groveton townsite, dry, TD 10,259 ft.

Walker County: Moran Oil Co. 1 J. W. Oliphant, in Wm. McDonald Sur., 7 mi. SW of Huntsville townsite, dry, TD 6,130 ft.

Wharton County: S. A. Brewster and W. O. Bartle 1 E. L. Dammerman, in E. C. Ogden Sur., 1 mi. SE Hillje townsite, dry, TD 6,351 ft.

Floyd L. Karsten 1 Charles Bacak, in E. C. Ogden Sur., 1¾ mi. due N of El Campo field production, dry, TD 7,156 ft.

(Week Ended January 24)

Liberty County: Gulf Oil Corp. 1 J. M. Neal, in S. Strong Sur., 8 mi. N of Hardin townsite, 4 mi. N of Hardin production, dry, TD 8,514 ft.

San Jacinto County: F. A. Callery 1 M. P. Hinchliff, in H&TC Sur., 2¼ mi. E of Mercy field production, 7 mi. N of Cleveland townsite, dry, TD 8,541 ft.

N. CENTRAL TEXAS

Continental Opens Pool In Montague County

WICHITA FALLS.—Continental Oil Co. 1 C. P. Miller, Block 21, Limestone County School Lands, opened a major Bend conglomerate field in northwestern Montague County 1 mile west of Stoneburg. The well kicked off after being swabbed down to 3,500 ft. and flowed 248 bbl. of oil in 7 hours, through 1-in. opening. Tubing pressure was 125 psi. The well was shut in for 2 hours, during which time tubing pressure built up to 650 psi., resulting in a flow of 345 bbl. of oil in 10 hours through 25/64-in. choke. Operators then shut it in for potential test. Production is through perforations between 6,190-6,204 ft.

In Montague County, 2 miles southeast of Mallard, L. W. Barrett 1 McCall, J. G. Cox Survey, topped the Caddo at 6,366 ft., drilled to 6,389 ft., and ran a 1-hour drill-stem test. Recovery was an unspecified amount of oil and gas-cut drilling mud. It was deepening for a second test.

Sinclair Prairie Oil Co. 1-A Minor, 2 miles northwest of Montague, took a 20-minute drill-stem test on the Bend conglomerate between 6,237-47 ft. Gas came to the surface in 5 minutes, and the recovery was 15 ft. of oil-cut mud, plus 75 ft. of drilling mud. Bottom-hole pressure was 2,550 psi. in 15 minutes. Previously, the well reported a flow of oil on a test between 6,184-94 ft. Operators continued drilling below 6,285 ft. in shale.

In Clay County, S. D. Johnson 1 Wines, 3 miles southwest of Halsell, was flowing by heads, being 50 per cent oil and the rest drilling water. Production is thought to be coming from the Simpson between 6,062-82 ft.

Cities Service Oil Co. 1 H. W. Schlittler.

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Block 1,648, TE&L Survey, had gas in the Caddo limestone and was drilling ahead to the water. A drill-stem test from 3,808-28 ft. recovered 50 ft. of gas-cut mud in 30 minutes. Bottom-hole pressure was 250 psi. Location is 1 mile south of production in the Donnell pool, eastern Throckmorton County.

In north-central Throckmorton, Hunt Oil Co. 1 Tharp, 1-mile northwest outpost to Brown Caddo field, placed top of the Mississippi at 5,065 ft., and the Ellenburger at 5,273 ft. Operators drilled to 5,293 ft., and ran a 30-minute drill-stem test between 5,273-93 ft. Recovery was 20 ft. of mud, with no shows. It was deepened to around 5,500 ft. for a test of the Ellenburger.

Week's completions in West-Central Texas, District 7-B, were 3 oil wells and 17 dry holes. A shallow cable tool wildcat, 10 miles northeast of Abilene, pumped 22 bbl. of oil a day. Eight dry wildcats were in Callahan, Fisher, Haskell, Jones and Palo Pinto counties. In North Central Texas, District 9, 17 wells completed as producers, and 18 were dry. Included in the total were 5 wildcats in Archer, Cooke, Grayson and Jack counties.

New locations reported in North Central Texas totaled 49. Twenty-nine locations were listed in West Central Texas counties.

NORTH CENTRAL TEXAS WILDCAT FAILURES (DISTRICT 9)

Archer County: Dick Jones et al 1 Turbeville, Blk. 21, J. W. Harris Subd., 12 mi. W Archer City, dry in sand at 1,450 ft.

Reno Oil Co. 1 L. F. Wilson, Blk. 9, ATNCL Sur., 5 mi. S Holliday, dry, TD 1,622 ft. in shale and sand.

Cooke County: Seitz Bros. and A. R. Dillard 1 J. L. Glodfelter, W. P. Mitchell Sur., 5 mi. SE Gainesville, dry, TD 3,981 ft., Ellenburger 3,970 ft., no shows.

Grayson County: Haynes B. Owenby 1 Ben McWain and M. H. Norman, T. J. Shannon Sur., A-1,137, 3 mi. NE Sherman, dry, TD 4,824 ft. in shale.

Jack County: L. T. Burns and Bobby Burns 2 L. S. Wright, T. S. Brooks Sur., 1¾ mi. NW Antelope, dry, TD 4,599 ft.

WEST CENTRAL TEXAS SUCCESSFUL WILDCAT (DISTRICT 7-B)

Jones County: E. H. R. Sabens et al 1 B. J. Rutledge, F. Sieberman Sur. 13, 10 mi. NE Abilene, pumped 22 bbl. of 38°-gravity oil a day, oil sand 1,717-26 ft., TD 1,896 ft., PB 1,730 ft., elev. 1,622 ft.

WEST CENTRAL TEXAS WILDCAT FAILURES (DISTRICT 7-B)

Callahan County: J. A. and J. W. Stover 1 Olin Elliott, Sec. 2,050, TE&L Sur., 3½ mi. S Moran, dry, TD 589 ft. in shale.

Fisher County: Danciger Oil & Refining Co. 1 Annie Cochran, Sec. 31, Blk. 3, H&TC Sur., 11 mi. SW Rotan, dry, TD 7,017 ft., Valera 1,910 ft., Ellenburger 6,967 ft., no shows, elev. 2,136 ft.

Haskell County: Nelson & Edward Morris, Ltd., 1 H. M. Stone, Sec. 22, Blk. 1, H&TC Sur., 1½ mi. SW Haskell, dry, TD 4,730 ft., Dotham 1,790 ft., Saddle Creek 2,130 ft., Palo Pinto 3,827 ft., elev. 1,575 ft.

Jones County: B. E. Ransdell 1 Williams, W. M. Delk Sur., 5 mi. SE Hawley, dry, TD 2,231 ft., sand with show of dead oil 2,053 ft.

E. H. R. Sabens 1 B. A. Young, Sec. 71, Blk. 14, T&P Sur., 4 mi. S Nugent, dry, TD 2,100 ft. in shale.

Star Oil Co. 1 J. J. Steele, Sec. 11, Blk. 2, SPRR Sur., 5 mi. SE Anson, dry, TD 3,005 ft., Flippen 2,275 ft., Hope sand 2,420 ft., Gunsight 2,540 ft., Swastika sand 2,630 ft.

Ungren & Frazier 1 C. W. Jones, Sec. 34, Blk. 2, SPRR Sur., 9 mi. SW Anson, dry, TD 3,304 ft. in shale.

Palo Pinto County: J. R. Tolbert 1 J. N. Stuart, Sec. 55, Blk. 3, T&P Sur., 7 mi. N Strawn, dry, TD 1,900 ft. in shale.

(Week Ended January 24)

Callahan County: A. G. Hill 1 Maggie Hardy heirs, Sec. 12, ET RR Sur., 6 mi. N Baird, dry, TD 1,360 ft., sand with slight show of gas 1,110 ft.

Jones County: Chapel Hill Gas System 1-B B. L. Ellis, Sec. 40, Blk. 15, T&P Sur., 10 mi. S. Anson, dry, TD 2,400 ft. in limestone.

Hunt Oil Co. 1 W. H. Hollis, Sec. 26, Blk. 15, T&P Sur., 4 mi. N Hawley, dry, TD 2,557 ft., coal 2,138-41 ft., sand with show of oil 2,144-56 ft., limestone with slight show of oil 2,156 ft.

T. A. Kirk et al 1 Eula Phillips, Harrison County School Land Sur. 334, 10 mi. W Anson, dry, TD 3,245 ft., Flippen sand 2,806 ft., Swastika sand 3,224 ft. with odor of oil.

Robertson, Knode & Prior 1 J. J. Holder, Sec. 10, D&DA Sur., 2 mi. W Avoca, dry, TD 3,432 ft., Dotham 1,520 ft., Saddle Creek 1,795 ft., Flippen limestone 1,870 ft., Palo Pinto 3,420 ft.

Wrather, Penn & Walters 1 C. L. Bishop, Sec. 22, Blk. 19, T&P Sur., 6 mi. NW Merkel, dry, TD 2,582 ft., Noodle Creek 2,558 ft., had slight shows of oil and gas.

Shackelford County: S. D. Johnston et al 1 G. R. Davis, Sec. 56, Blk. 13, T&P Sur., 13 mi. NE Abilene, dry, TD 4,930 ft., Palo Pinto 3,385 ft., Caddo 4,455 ft., conglomerate 4,758 ft., Mississippian 4,795 ft., Ellenburger 4,885 ft., soft dolomite with stain and odor 4,923-30 ft., elev. 1,840 ft.

Don Knight 2 G. R. Davis, Sec. 17, Blk. 13, T&P Sur., 7 mi. SE Nugent, dry, TD 1,691 ft. in sand.

EASTERN TEXAS

Arrow, Sells to Test Travis Peak, Pettit

DALLAS.—In the Longwood area of Harrison County, Arrow Drilling Co. and Sells Petroleum Co. 1 Allen, Evans Survey, had total depth at 6,323 ft. in the Travis

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It has been decided to enter some modifications in the general conditions of the contract documents. The text of amendment can be examined at any of the following offices:

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b) The Royal Iraqi Embassy, 22 Queen's Gate, London, S.W. 7

c) The Royal Iraqi Embassy, Washington, D. C.

d) The Royal Iraqi Consulate General, 36 Riverside Drive, New York City

MINISTER OF ECONOMICS

Peak, and stopped to set casing at 6,250 ft. Operators plan to test the Travis Peak and Pettit zones, as both indicated porosity on the electric log. The 1 Allen is southwest of production. Approximately 1 mile northeast of the Allen well, Phillips Petroleum Corp. 1 Rudd was drilling below 5,597 ft. It is Phillips first operation in the area.

The Texas Co. 1 Broadway, prospective second producer in the Blackfoot field of Anderson County, showed better promises of production last week. This test failed to find production in the Pettit, from which the discovery flowed 206 bbl. potential, but made 22 bbl. of oil from the Rodessa at 8,972-92 ft. after acidizing. Operators then swabbed the well, and reported a larger flow.

Magnolia Petroleum Co.'s deep wildcat, the 1 Fair, southwest of Lindale in Smith County, recovered 16 gal. of clear water on a test of perforations between 10,327-337 ft., then set plug at 10,215 ft. and perforated at 10,150-154 and 10,158-164 ft. for a second test. It is in the Travis Peak, topped at 10,155 ft.

W. M. Coates 1 Hall, Bowie County, was drilling below 7,655 ft. in sand and shale, with no shows reported. Sample top on the Cotton Valley was placed at 6,540-50 ft. Shell Oil Co., Inc., 1 Smith, Cass County, was unchanged in drilling below 9,922 ft. in shale and lime. In Cherokee County, General Crude Oil Co. 1 H. K. Black had total depth at 4,937 ft. and was coring ahead, but had no shows. Samples placed top of the Austin at 4,600-30 ft., and base at 4,830-40 ft.

Twelve completions were reported for the week, comprising 4 oil wells, 2 gas and 6 dry. In this total were 5 dry wildcats.

EAST TEXAS WILDCAT FAILURES
(DISTRICTS 5 AND 6)

Anderson County: Canley Oil Co. 1 Davey & Royall, John Squyres Sur., A-747, 11 mi. SE Palestine, Camp Hill field area, dry, TD 404 ft.

S. D. Ford 1 J. G. McLen et al, Samuel Phillips Sur., 6½ mi. SW Elkhart, dry, TD 5,503 ft. (corrected), Pecan Gap 3,785-4,048 ft., by samples, Woodbine 5,352 ft., elev. 220 ft.

Cass County: Arkla Oil Co. 1 J. M. Lindsey, J. F. Frazier Sur., 11 mi. N Atlanta, dry, TD 7,298 ft., sample top on Travis Peak 6,905 ft., no shows, elev. 337 ft.

Kaufman County: B. G. Byars and R. L. Peveto 1 Bertie P. Shaddy, J. Sharp Sur., 4 mi. SW Kemp, dry, TD 3,100 ft., Nacatoch 405 ft., Pecan chalk 1,285 ft., Austin 1,990-2,494 ft., sub-Clarksville sand 2,525-38 ft., Eagleford shale 2,538 ft., Woodbine sand 2,904-2,998 ft.

Trinity County: Continental Oil Co. 1 R. E. Holcombe, J. W. Bowman Sur., A-102, 10½ mi. N Groveton, dry, TD 10,259 ft., Wilcox 1,913 ft., lower Cretaceous 6,880 ft., Pecan 7,140 ft., Austin 7,812 ft., Woodbine 8,127 ft., elev. 367 ft.

(Week Ended January 24)

Anderson County: O. W. Killam 1 L. C. Peterson estate, Walter F. Poole Sur., 1½ mi. SW Cuney, dry, TD 4,517 ft., Pecan 3,260 ft., Austin 4,190 ft., Eagleford 4,265 ft., Georgetown 4,360 ft., salt 4,490 ft., by samples, elev. 304 ft.

Angelina County: K. L. McHenry 1 E. R. Bolton, Vinceneti Michelli Sur., A-29, 6 mi. N Lufkin, dry, TD 6,435 ft., Navarro 4,738 ft., Comanche 6,127 ft., by samples, elev. 207 ft.

Cass County: Arkla Oil Co. 1 C. I. Glass, John C. Gahagan Sur., 6 mi. SE Atlanta, dry, TD 7,338 ft., in Travis Peak topped 6,882 ft., elev. 334 ft.

Falls County: Jack Shaunfield 1 S. B. Landrum, George Allen Sur., 8 mi. SW Marlin, dry, TD 1,962 ft. in shaly limestone, had slight show of oil at 1,034-62 ft.

Kaufman County: B. G. Byars & R. L. Peveto 1 B. P. Shaddy, J. Sharp Sur., 4 mi. SW Kemp, dry, TD 3,060 ft. in Woodbine, no top reported.

Lamar County: Denver Daugherty et al 1 Otto Stephens, Joshua Morgan Sur., 11 mi. N Petty, dry, TD 2,850 ft., Paluxy 1,770 ft., by samples, elev. 580 ft.

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MISSISSIPPI

Second Oldenburg Field Producer Being Completed

JACKSON.—The second oil producer for the recently opened Oldenburg field, Franklin County, Mississippi, is being completed at Danciger Oil & Refining Co. 1 Stark-McKinney Unit, 25-7n-2e, 1,200 ft. west of the pool opener. The well was drilled to 10,540 ft. after topping the sand at 10,526 ft. The 7-in. pipe was set at 10,540 ft. and perforations made at 10,538-539 ft. On a 48-hour drill-stem test, the well started flowing oil in 1½ minutes and at the end of the test the flow was estimated at 6 bbl. of 38°-gravity oil an hour through a 7/64-in. choke, no water.

In Heidelberg Graben, Danciger Oil & Refining 1 George Simmons, 36-1n-12e, recovered sand with good oil odor and stain in A-1 sidewall cores at 7,963 ft., 7,967 ft., 7,970 ft., and 7,972 ft. Operators are making preparations for a test. The 7-in. casing has been set at 7,347-8,013 ft., and this sand will be perforated for drill-stem test.

James E. Kemp 3 H. M. Marks has been completed as one of the best wells in the La Grange field, Adams County. The well flowed 180 bbl. of 44°-gravity oil per day through 5/32-in. choke, tubing pressure 525 psi. Production is through perforations at 6,237-46 ft. in the Wilson sand.

MISSISSIPPI WILDCAT FAILURE

Adams County: Placid Oil Co. 1 U. S. A., 30-5n-1w, dry, TD 11,338 ft. Electric log tops: Wilcox 4,644 ft., Midway 8,558 ft., Selma 9,367 ft., Austin 9,763 ft., Base Austin chalk 10,210 ft., Tulscaloosa 10,343 ft., Marine Tuscaloosa 10,702 ft., Base Marine Tuscaloosa 11,014 ft., tight

sand 11,040-050 ft., Massive sand 11,124-182 ft., Comanche 11,182 ft.

(Week Ended January 24)

Carroll County: The Texas Co. 1 E. G. Whitehead et al, 22-18n-5e, dry, TD 5,283 ft., Wilcox 270 ft., Midway 1,224 ft., Selma 1,982 ft., Comanche 3,615 ft., Paleozoic 5,215 ft.

Walthall County: Humble Oil & Ref. Co. 1 P. H. Enochs et al, 18-3n-12e, dry, TD 11,484 ft., Wilcox 3,680 ft., Midway 6,900 ft., Selma 7,706 ft., Austin 8,611 ft., base Austin chalk 8,890 ft., Tuscaloosa 9,110 ft., Marine Tuscaloosa 9,727 ft.

ALABAMA WILDCAT FAILURE

Mobile County: E. B. Sullivan 1 Q. V. Thompson, 31-2n-2w, dry, TD 9,008 ft. Electric log tops: Wilcox 1,773 ft., Midway 3,674 ft., Selma 4,443 ft., Eutaw sand 5,700 ft., Tuscaloosa 5,899 ft., Marine Tuscaloosa 6,383 ft., Lower Tuscaloosa 6,774 ft., Massive sand 6,915 ft., Comanche 7,178 ft.

FLORIDA WILDCAT FAILURES
(Week Ended January 24)

Hardee County: Humble Oil & Refg. Co. 1 B. T. Keen, 23-35s-23e, dry, TD 11,933 ft.

SOUTHWEST TEXAS

Tide Water Discovery Flowing From New Sand

CORPUS CHRISTI.—Tide Water Associated Oil Co. 1 Guaranty Title & Trust Co., deep discovery well just east of Saxet field and west of Corpus Christi, in Nueces County, flowed 198 bbl. of pipe-line oil per day through a 5/32-in. choke, with gas-oil ratio of 3,500 and tubing pressure of 2,100 psi., casing sealed. Gravity of the oil was 46.2°, with no water. Production is through 396 perforations between 11,115-70 ft. in the entire sand section. This is believed to be an entirely new formation for South Texas, called by some as in the basal Frio, and others as in the upper Vicksburg.

A new pay zone for Cage Ranch field, in Brooks County, has been opened by Shell Oil Co., Inc., 2-C Jimmie Cage, in the Leonardo Vargas Grant. Total depth is 8,348 ft., with 7-in. casing set to 6,170 ft., and 5½-in. casing at 7,950 ft. On test, through perforations at 7,848-68 ft. and 7,805-20 ft., the well flowed 3,588,000 cu. ft. of gas per day and 137.94 bbl. of 59.2°-gravity condensate per day, plus 2.55 bbl. of water per day, through a ¼-in. choke; open flow potential rated at 18,000,000 cu. ft. per day. Shut-in pressure is 3,124 psi.

A new gas-condensate discovery, southwest of Longhorn field, Duval County, Hiawatha Oil & Gas Co. 1-A Denman, gaged 10,000,000 cu. ft. of gas per day on open flow, with 18.5 bbl. of colored condensate per million cubic feet of gas, through perforations at 4,844-52 ft. Total depth is 5,757 ft., with 5½-in. casing set to 5,120 ft. for the completion.

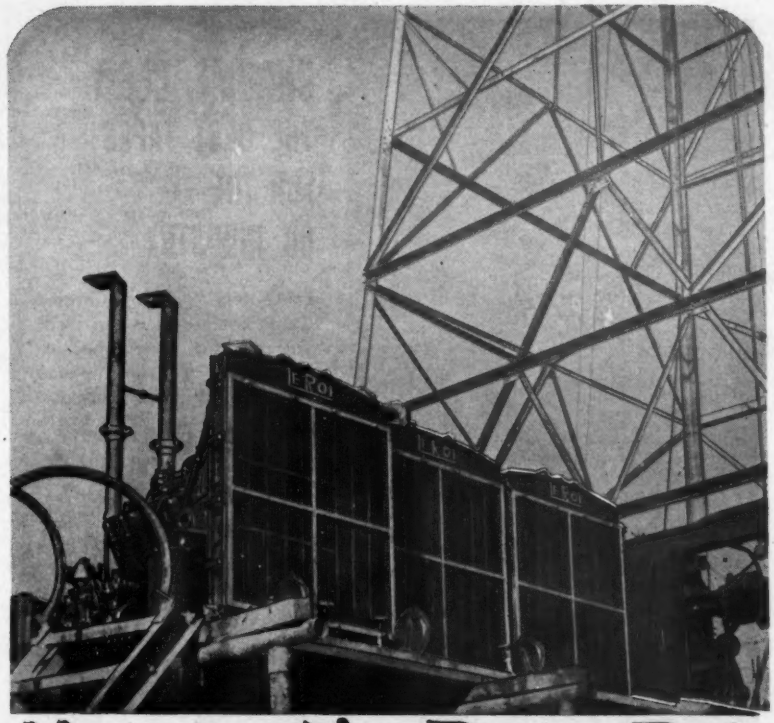
SOUTHWEST TEXAS (DISTRICT 1)
WILDCAT FAILURES

Williamson County: Ben F. Griffith 1 Paul Czimsky, in H. Good Sur., 1½ mi. NW of Chapman-Abbott field, 12 mi. SE of Taylor, dry, TD 1,829 ft.

SOUTHWEST TEXAS (DISTRICT 4)
SUCCESSFUL WILDCATS

Aranasas County: New gas condensate pay Fulton Beach field—Wm. H. Hunt Trust Est. 4 Spencer-Kent-Crane, in C. O. D. Gilliland Sur., 4½ mi. N of Rockport, top pay 6,947 ft., TD 7,471 ft., perf. 6,947-54 ft., IP: 20,000 cu. ft. gas per day on open flow, gas-condensate ratio 34,059, shut-in pressure 2,721 psi., gravity 56.8°, no water.

Duval County: New oil pay Squire field—Santa Clara Oil Co. and John F. Camp & Sons 8-C Jas. F. Welder Hrs., in M. C. Nunez Sur. 4, top pay 3,757 ft., Pettus sand, TD 3,890 ft., perf. 3,757-59½ ft., IP: 93 bbl. oil per day through a 3/16-



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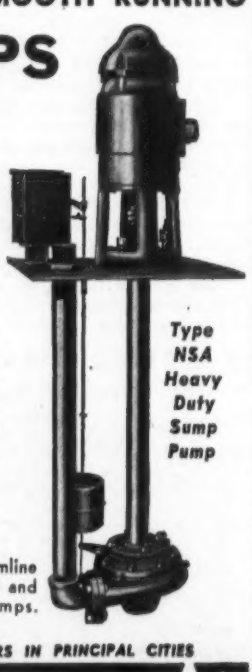

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SOUTHWEST TEXAS (DISTRICT 4) WILDCAT FAILURES

Duval County: Hunt Oil Co. 1 F. V. de Chapa, in Jose Antonio Gonzales Grant, 3 mi. SE of Concepcion, 3 mi. NW of Santa Cruz, dry, TD 7,332 ft.

Jim Hogg County: La Gloria Corp. 2 S. K. East, in GC&SF Sur. 279, TD 6,008 ft.

Starr County: Jergins Oil Co. 1 T. B. Slick Est., in El Panal Grant, 4 mi. E of Rincon field, dry, TD 6,505 ft.

Webb County: O. W. Killam 3 Garcia Hrs., in Sur. 592, Los Ojuelos Grant, 3 mi. SE of Mirando City, dry, TD 1,897 ft.

Zapata County: W. L. Golston 1 Ramirez et al, in Sam Hone Sur. 270, 10 mi. SW of Randado, dry, TD 2,800 ft.

(Week Ended January 24)

Brooks County: Jergins Oil Co. 1 L. G. Denman, in Tr. 22, Subd. of L. G. Denman and Kathleen M. Hocker lands, Las Magueyes de Palo Blanco Gr., 18 mi. W of Falfurrias, dry, TD 5,500 ft.

Jim Hogg County: Balridge & King et al 1 Sarita K. East, in H&GN Sur. 35, 16 mi. SW of Hebbronville, dry, TD 4,514 ft.

Jim Wells County: H. R. Smith & W. C. McBride, Inc., 1 Heiko Groenveld, Lot 7, Blk. 13, Benton Pasture Subd., 7½ mi. E of Alice, 1 mi. SE of Bentonville, dry, TD 6,301 ft.

Kenedy County: Humble Oil & Refg. Co. 2-B John G. Kenedy, Lot 12, Blk. 6, Sarita Farm Trs. Subd., ½ mi. NE of Sarita, in El Paistle Gr., dry, TD 11,560 ft.

Nueces County: Fred W. Shield 1 August Witte, Sec. 19, Laureles Farm Trs., Subd., 12 mi. SW of Corpus Christi, dry, TD 7,250 ft.

CALIFORNIA

Seaboard Adds Third Well To Kern County New Pool

LOS ANGELES.—Completion of its third well in the Bacon Hills area of Kern County this week by Seaboard Oil Co. definitely confirmed the discovery of a small but important oil field. Seaboard's 26-21, in 21-28s-20e, was turned to tanks flowing 400 bbl. of 38°-gravity oil and 300,000 cu. ft. of gas through a 13/64-in. choke. Total depth is 8,070 ft. Producing sand is the Oceanic.

The discovery well, 3-21 Seaboard-Bandini, was brought in last May for 54 bbl. of 37.8°-gravity oil on the pump, causing some doubt that the discovery was of consequence considering the depth of the pay. In September, No. 24-21 was brought in for a more impressive initial of 175 bbl. through a 19/64-in. choke. All three wells are in the west half of section 21-28s-20e, and location has been staked for No. 58-21 in SW SE of the section.

Shell has apparently made a small discovery about 1 mile northwest of the Athens field in the Athens Heights area of Los Angeles County. The company's 1 Moser Community in 12-3s-14w, just outside the Los Angeles city limits, flowed during a test at the rate of 263 bbl. gross, 12 per cent cut, through a 19/64-in. choke, with gravity of the oil unreported. Total depth was 8,792 ft., but the well was subsequently killed in order to deepen. Discovery may possibly prove to be an extension of an existing pool as Shell has a small producing well about ¼ mile to the northwest.

CALIFORNIA WILDCAT FAILURES

Kern County, Round Mountain area: Balscher Oil Co. 1 Howells, 32-28s-29e, dry, elev. 718 ft., Gray Vedder 2,223 ft., TD 2,250 ft.

McDonald Anticline area: Independent

Exploration Co. 1 Layman, 18-28s-20e, dry, elev. 988 ft., TD 4,145 ft.

Independent Exploration Co. and The Superior Oil Co. 62 Theta, 20-28s-20e, elevation 968 ft., Oceanic 5,916-37 ft., TD 6,600 ft.

Fresno County, Coalinga area: Carl W. Weller 1 Weller, 32-20s-15e, dry, elev. 677 ft., TD 3,100 ft.

Yolo County, Pleasant Creek area: Shell Oil Co., Inc., 1 Pleasant Creek Unit, 22-8n-1w, dry, elev. 137 ft., TD 6,250 ft.

Los Angeles County, Newhall area: Standard Oil Co. 5-1 Newhall L.&F., 34-4n-16w, dry, elev. 1,232 ft., TD 9,296 ft.

Orange County, Richfield area: Universal Cons. Oil Co. 1 C. & T., 5-4s-9w, dry, elev. unknown, TD 6,969 ft.

Santa Barbara County, Orella area: Shell Oil Co., Inc., 2-1 Careaga, 36-5n-31w, dry, elev. 273 ft., TD 1,763 ft.

(Week Ended January 24)

Los Angeles, County, Alondra area: General Petroleum Corp. 1 Alondra Community 8, 16-3s-14w, dry, elev. unknown. top Schist 8,922 ft., TD 8,985 ft.

San Luis Obispo County, Cuyama area: William J. Murray 1 North Dome, 3-11n-26w, elev. 2,200 ft., TD 2,340 ft., redrilled to 1,706 ft.

Fresno County, N. Coalinga area: The Sharples Oil Corp. 52 Jordan, 34-18s-15e, elev. 728 ft., "A" 2,240 ft., "B" 2,344 ft., "C" 2,542 ft., "E" 2,730 ft., Kreyenhagen 3,190 ft., TD 3,217 ft.

Kern County, Ant Hill area: Universal Cons. Oil Co. 1 M. & T., 14-29s-29e, elev. 847 ft., top Vedder 3,955 ft., TD 4,165 ft.

Monterey County, San Ardo area: The Texas Co. 2 Lombardi, 27-22s-10e, elev. 487 ft., TD 2,470 ft.

ROCKY MOUNTAIN

Husky Coring Ahead in Pitchfork Field Test

DENVER.—Husky Refining Co. of Cody on drill-stem test of the Madison at Pitchfork, Park County, Wyoming, recovered 100 ft. of 14°-gravity oil in 30 minutes. The well is 5 Unit, NW NW SE 11-48n-102w, 24 miles south of Cody. Top of the Madison was found at 4,219 ft. and the operator is now coring below 4,300 ft. Pitchfork field is located on a long, narrow anticline and the discovery well was drilled by Honolulu Oil Co. in 1930. Production from the field has been from the Embar-Tensleep formation, and the field is now producing 325 bbl. of oil daily from three wells.

Gas tested at Boundary Butte, Utah.—On drill-stem test of the Byrd-Frost, Inc., Western Natural Gas Co., P. B. English wildcat at Boundary Butte, San Juan County, Utah, the well flowed at an estimated rate of 200,000 cu. ft. of gas daily. The test was made between 4,625-4,677 ft. in the Hermosa (Pennsylvanian).

Torchlight, Wyoming, extension tests.—Stanolind Oil & Gas Co.'s Well No. 2 Orchard Unit, SW NE SE 24-51n-93w, Big Horn County, flowed at the rate of 1,000 bbl. of fluid per day from the Tensleep sand, and the operator is now drilling for a test of the Madison. This well found the Tensleep at 3,040 ft. and the drill-stem test showed 90 per cent water and 10 per cent oil in that horizon. The well is ¼ mile southwest of Stanolind's Tensleep discovery well on this structure, completed last October with an initial of 1,632 bbl. of oil in 24 hours. The high percentage of water at this location, which is less than 100 ft. lower structurally than the discovery well, indicates that ultimate recovery in the Tensleep in this field will be very small. The Madison has not been tested.

Completions.—There were 15 completions during the week with 8 of the wells in Wyoming, 5 in Colorado and two in Montana. Total initial production was 3,157 bbl.

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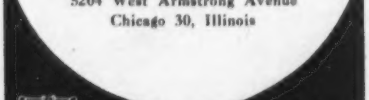

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of oil. The largest completion for the week was Morton Oil Co.'s 2 Michaels, NW NE NE 26-44n-63w, in the Mush Creek field, Weston County, Wyoming. This test flowed 1,000 bbl. of oil in 24 hours from Newcastle sand 3,867-3,886 ft., and extended the field one location west of previous production.

WILDCAT FAILURES IN WYOMING

Castle Creek, Natrona County — British-American & Oil, Incorporated, 3 Government-Davis, NW NE NW 24-38n-81w, TD 2,272 ft., Third Wall Creek 2,265, saturation 2,267-72, swab 1 bbl. fluid per hour, 60 per cent oil.

Old Woman Creek, Niobrara County: L. C. Jacox 1 Government, SW SW NW 15-37n-62w, 1,870 TD. Converse 1,415, Leo 1,750, elev. 4,005.

WILDCAT FAILURE IN COLORADO

Ridgeway, Ouray County: Pilling et al 1 fee, C SW NE 7-45n-8w, 1,601 TD, Dakota 510, Morrison 692, Cutler 1,576.

WILDCAT FAILURE IN MONTANA

Northwest Elk Basin, Carbon County: Seaboard Oil Co. 88-19-G, SE SE SE 19-9s-23e, 5,686 TD. Cody 2,170, Peay 4,096, Frontier 4,145, Dakota 5,115, Lakota 5,290, Morrison 5,340, water.

(Week Ended January 24)

Hill County: Texas Co. 1 Unit, NE NE 32-36n-14e, dry, Madison 4,150 ft., Three Forks 4,920 ft., Potlash 5,010 ft., Jefferson 5,110 ft., Cambrian 6,186 ft., elev. 3,035 ft., TD 6,212 ft.

Liberty County: Union Oil Co. 1 State, CSW 16-35n-7e, dry, elev. 3,310 ft., Milk River 550 ft., Colorado 965 ft., Blackleaf 1,710 ft., Kootenai 2,645 ft., Ribbon Sand 2,953 ft., Ellis 3,040 ft., Madison 3,280 ft., TD 3,302 ft.

Yellowstone County: Mon-O-Co Oil Corp. 1 Mackay, S½ SW NE 20-2n-26e, dry, Eagle 807 ft., Colorado 1,320 ft., Frontier 2,698 ft., Sundance 4,138 ft., Madison 5,547 ft., TD 5,924 ft.

MICHIGAN

Extreme Cold Slows Michigan Operations

SAGINAW.—Michigan's most extended extreme cold wave in a dozen years has oil and gas field operations near a standstill.

Operations in the field resulted in nine completions, and 12 new locations were announced. Three oil wells were completed, one for 50 bbl. a day in Bay County, one for 30 bbl. in Montcalm and one for 16 bbl. in Isabella. A Roscommon County gas well was rated at 12,100,000 cu. ft. Three of the five dry holes were wildcats.

MICHIGAN WILDCAT FAILURES

Bay County, Pinconning Township: J. O. Mutch 1 Karl and Anna Gobrogge, SW SE SW 21-17n-4e, dry in Dundee, TD 3,059 ft.

Kent County, Byron Township: J. W. Lang Co. 1 Jacob Meckhof, NW NW SE 32-5n-12w, dry in Traverse limestone, TD 1,715 ft.

Mecosta County, Aetna Township: Chapman Oil Co. 1 L. D. Clark et al, NW SW NW 25-13n-10w, dry in Traverse, TD 1,207 ft.

(Week Ended January 24)

Allegan County, Allegan Township: H. L. Wadsworth and W. Spencer Cook 1 Frank Clawson, NW NE NE 8-2n-13w, dry in Traverse limestone, TD 1,577 ft.

Arenac County, Lincoln Township: Ervin Major 1 Frank and Caroline Haas, NE SE NW 17-18n-4e, dry in Dundee, TD 3,058 ft.

Bay County, Pinconning, Township: Ward Oil Co. 1 L. V. Sisson, SE SE SW 34-17n-4e, dry in Dundee, TD 3,046 ft.

ILLINOIS

Clay County Wildcat Flows 600 Bbl. Day

MATTOON.—Pump has been installed in a Clay County successful wildcat, Calvert-Willis, Inc. and Ashland Oil & Refining Co. B-1 Bemis, SW SE NE 8-3n-8e, and the well is producing at the pump capacity of 350 bbl. per day after flowing

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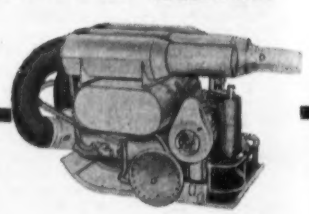

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600 bbl. per day until the pump was installed. The well, located about 1½ miles northeast of Clay City, is testing the McClosky lime through perforations at 3,006-06, 3,019-23, and 3,036-42 ft. Total depth was 3,072 ft. Well was treated with 2,000 gal. of acid.

ILLINOIS WILDCAT FAILURES

Clay County: Marvin 1 Hogan Hrs., NE SE NE 28-4n-7e, dry, TD 3,105 ft.

Ashland & Arvin 1 A. Hogan, NW NW SE 33-4n-7e, dry, TD 3,105 ft.

Pure 1 Smith-Moore, SW NW SE 33-3n-6e, dry, TD 3,188 ft.

White County: Vic Gallagher 1 Blackford, NE NW SE 28-3s-8e, dry, TD 3,432 ft.

KANSAS

Good Discovery Prospects For Northeast McPherson

PRELIMINARY tests at the Westgate-Greenland Oil Co. and Mallard Drilling Co. 1 Burk, NW NE SE 7-18s-1w, McPherson County, indicate possible production of 160 bbl. from the Mississippian chat, topped at 2,736 ft. The new well is located 1 mile south of the Hoffsommer pool.

Northeast McPherson County has another prospect in the Westgate-Greenland and Mallard 2 Hart, SW SW SW 33-17s-1w, where the casing has been set at 2,700 ft. after topping the chat at 2,685 ft. The well is 1 mile east of the Georob pool where the discovery well was completed last June with an initial production of 160 bbl.

Russell County also appears to have an extension to the Driscoll field in the Brunson Drilling Co. 1 N. Weber, SW NW SW 31-15s-11w. Arbuckle was topped at 3,318 ft. and total depth was 3,364 ft., with casing set at 3,320 ft. The well, about ½ mile southwest of the Driscoll field, had 850 ft. of oil in the hole after standing overnight.

Derby Drilling Co. 1 Finger, SE NW SW 28-16s-12w, Barton County, found oil about ¼ mile south of the Laudick pool, and 1 mile west of Beaver South. The well swabbed 2½ bbl. per hour from the Arbuckle. Pipe was set to 3,364 ft. and the well drilled to 3,370 ft. Operators are planning to treat the well with acid.

For the week, 62 completions and 56 locations were recorded. Barton County led with 13 completions and 11 locations, followed by Ellis with 10 completions and 4 locations, Butler with 6 completions and 4 locations, and Rice with 4 completions and 5 locations.

KANSAS SUCCESSFUL WILDCAT

Barton County: Darby Drilling Co. 1 Laudick, SE SW NW 28-16s-12w, pumped 195 bbl. of 39°-gravity oil per day from Arbuckle at 3,382-92 ft.; Lansing 3,131 ft., TD 3,430 ft.

KANSAS WILDCAT FAILURES

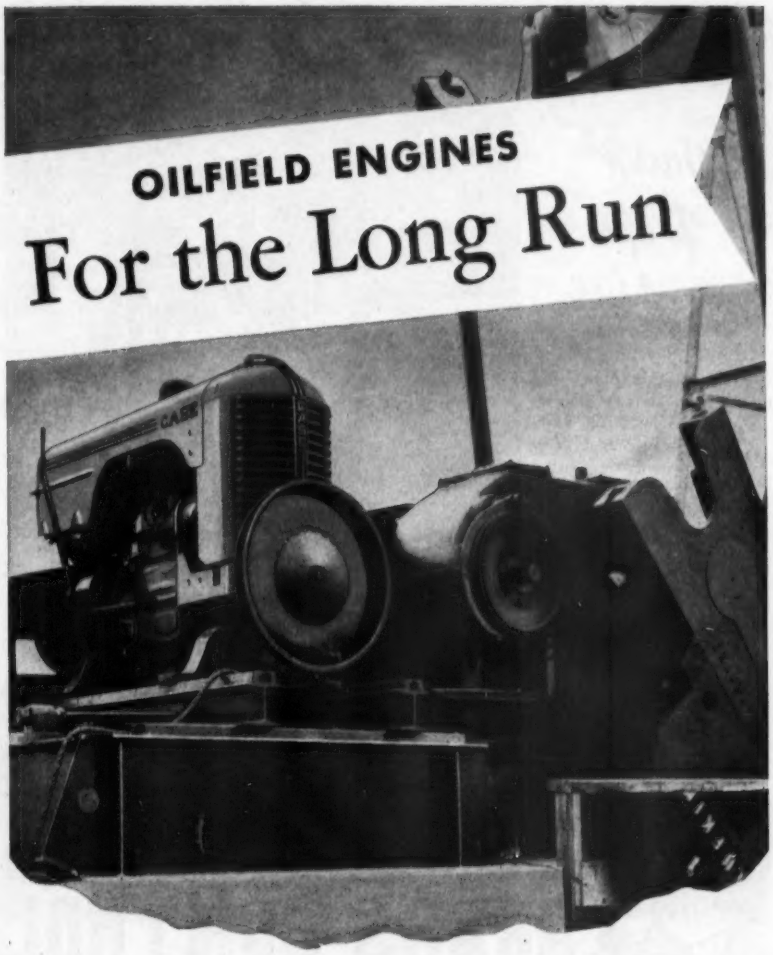
Barton County: Fred Rust 1 Finger, NW NW SE 21-17s-12w, dry, TD 3,460 ft., anhydrite 790 ft., Lansing 3,156 ft., conglomerate 3,414 ft., Arbuckle 3,428 ft.

Butler County: Ralph Wixon 1 Leirle, SW NW SW 31-23s-4e, dry, TD 2,738 ft., Mississippi lime 2,405-70 ft. with a slight show of oil, Hunton 2,561 ft., shale 2,627 ft., Viola 2,635 ft., Simpson 2,666 ft., Arbuckle 2,735 ft.

Comanche County: Gulf 1 Lorimor, C SE SW 36-31s-20w, dry, TD 6,365 ft., anhydrite 1,115 ft., Basal Red beds 1,610 ft., Herrington 2,482 ft., Cottonwood 3,057 ft., Heebner 4,067 ft., Douglas shale 4,138 ft., brown lime 4,256 ft., Lansing 4,276 ft., Basal Kansas City 4,826 ft., Mississippi lime 5,191 ft. with a stain and show of oil and gas, Simpson 6,148 ft., Arbuckle 6,306 ft.

Ellis County: Sohio & Continental 1 Beach, NE NE NW 4-11s-20w, dry, TD 3,844 ft., anhydrite 1,595 ft., Heebner 3,415 ft., Lansing 3,439 ft., conglomerate 3,721 ft., Arbuckle 3,799 ft.

Kingman County: A. G. Hill 1 Woolridge,



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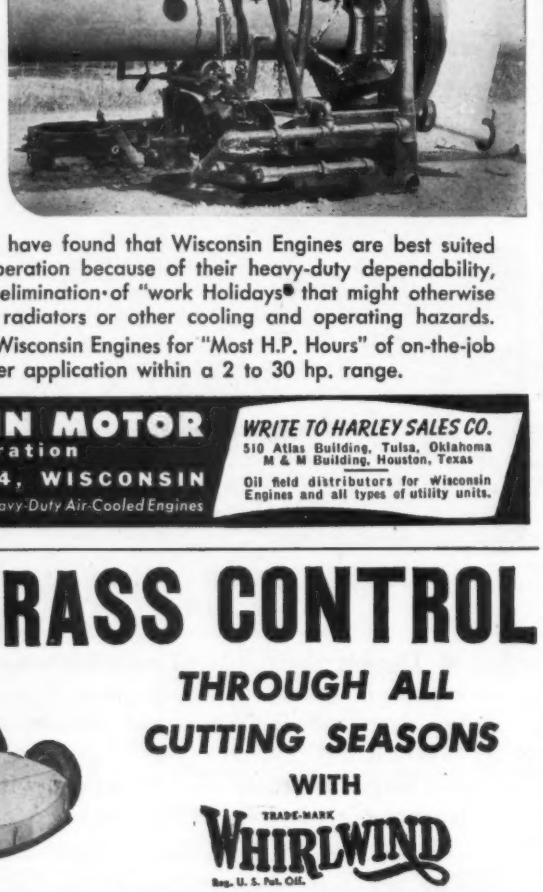

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SW NW NE 18-27s-7w, dry, TD 4,490 ft., Lansing 3,225 ft., Mississippian 3,880 ft., Simpson 4,342 ft., Arbuckle 4,430 ft.

Marion County: Frank Dieter & Saco Oil 1 Calleson, NW NW NW 12-22s-4e, dry, TD 2,552 ft., Kansas City lime 1,790 ft., Basal Kansas City 2,160 ft., Mississippian 2,335 ft., Kinderhook 2,393 ft., Viola 2,494 ft.

E. H. Adair 1 Jensen "B," SW SE SW 23-22s-4e, dry, TD 2,600 ft., Lansing 1,845 ft., Mississippian 2,424 ft., Basal Mississippian 2,480 ft., Viola 2,595 ft.

McPherson County: Don Ingling 1 Ratzloff, NW NE SW 2-18s-1w, dry, TD 3,295 ft., anhydrite 270 ft., Lansing 2,161 ft., Mississippian 2,750 ft., Viola 3,140 ft., Simpson shale 3,225 ft., Simpson sand 3,270 ft., Arbuckle 3,295 ft.

Rush County: Solar Oil 1 Tammen, SW SW SW 24-19s-16w, dry, TD 3,726 ft., anhydrite 1,014 ft., Lansing 3,358 ft., Basal Kansas City 3,403 ft., cherty conglomerate 3,637 ft., Arbuckle 3,659-67 ft. with a show of gas.

Stafford County: Plains Exploration 1 Jenkins, SE SE NE 31-24s-12w, dry, TD 4,215 ft., Topeka 3,150 ft., brown lime 3,545 ft., Lansing 3,565 ft., Basal Kansas City 3,833 ft., conglomerate 3,914 ft., Kinderhook 3,942 ft., Viola 3,979 ft., Simpson 4,108 ft., Arbuckle 4,174 ft.

OHIO, KENTUCKY

Gas Shortage, Cold Shut Down Ohio Operations

COLUMBUS.—The severe cold weather and the resulting critical gas shortage has caused a temporary shutdown in drilling operations in most parts of the state.

Cox Drilling Co. has drilled in a wildcat test on A. D. Ashford, Section 13, Clay Township, Muskingum County. Clinton sand was found at 3,894-3,915 ft. with 60,000 cu. ft. gas, and the Medina sand at 3,995-4,004 ft. was dry. After plugging to 3,920 ft. the Clinton was shot with 60 qt. and gaged 300,000 cu. ft. in 1 hour, and is holding steady at that gage and will be tubed.

Glenn Harmon completed a small well to extend Elyria pool a location to the south. The 1 Industrial Development Co., Section 3, Carlisle Township, Lorain County, gaged 188,000 cu. ft. in the upper Clinton at 2,327-32 ft. and an additional 220,000 cu. ft. when 3 ft. in the second Clinton.

OHIO WILDCAT FAILURES

Lake County, Leroy Township: Benedum-Trees 1 M. Celizie, Lot 23, Clinton 3,375-3,448 ft., TD 3,612 ft.

Meigs County, Chester Township: Roy Proffitt et al 1 David R. Will, Sec. 11, Brea 1,640-58 ft., TD 1,675 ft.

(Week Ended January 24)

Muskingum County, Newton Township: Oxford Oil Co. 1 M. C. Spillman, Sec. 16, Clinton 3,372-3,415 ft., Medina 3,480-85 ft., TD 3,495 ft.

EASTERN KENTUCKY

ASHLAND.— Floyd and Pike counties came in for sizeable completions during the week.

Kentucky-West Virginia Gas Co. completed well No. 5762 on the James Reynolds property, Floyd, at total depth of 3,511 ft., with production of 158,000 cu. ft in shale. A.S.

Kentucky-West Virginia Gas Co. completed well No. 5766, Robert Damron property, Pike County, at total depth of 2,580 ft., production of 671,000 cu. ft. in Big lime.

WESTERN KENTUCKY

OWENSBORO.—Tests at the Rex Alworth-Ashland 1 Leni Loving, 1-K-25, indicate another gas discovery for the new area 6 miles northeast of Madisonville in Hopkins

County. From an elevation of 423 ft., the 1 Loving was drilled to a total depth of 2,911 ft., encountering saturation in the Tar Springs at 2,220-36 ft. The 5½-in. casing was set at 2,300 ft. with alloy opposite the saturated interval. On a test of this interval, the well made an estimated 5,000,000 cu. ft. of gas. Testing is being continued.

INDIANA

EVANSVILLE.—The A. B. Barrow 1 Webb Crane, SW SW SW 4-3n-4w, Martin County, has been completed as a gas well, producing at 1,497-1,520 ft. in the Devonian. Initial production was 200,000 cu. ft. Total depth was 1,690 ft.

The J. W. Rudy-British-American 1 E. Straub, NW SE W½ SW 7-5s-11w, Vandenburgh County, is drilling ahead at 2,375 ft. with no pays reported as yet.

OKLAHOMA

Extension Attempts In North Okemah Area

AN oil pool in the old Castle-Morse-North Okemah district of Okfuskee County, which was discovered last October by the Jergins Oil Co., is creating considerable interest as a result of rich recoveries being made from the Wapanucka-Cromwell pay and is serving as an incentive for an intensive drilling campaign. Located in Section 34-12n-10e, northeast of Okemah, the new pool now has four completed oil wells and is the scene of two extension attempts.

North of the new area, B. B. Blair and L. B. Jackson are making a 5-day production test at the 1 Shirley, SW NE SW 27-12n-10e. After cementing pipe, operators acidized the well, then shot and reacidized before testing began. Results of the tests have not yet been announced. Meanwhile, the same operators are waiting for cement to set after setting casing at 3,128 ft. in a ½-mile extension try, the 1 McFadden, 26-12n-10e.

In 1945, a small pumping well was completed in Wapanucka pay about ¾ mile northwest of the area now occupied by the new pool. This well is still productive but is separated from the field by two abandoned producers and a dry hole. Only test drilled directly north of present activity was a 3,891-ft. dry hole in SE NE NW 27-12n-10e, about ½ mile farther north than the present extension test at the 1 Shirley. Nearest production to the northeast is a 4-well pool in Section 23.

OKLAHOMA SUCCESSFUL WILDCATS

Cotton County: New pay in Walters—Harper 1 Grimes, NE NW NE 21-1s-10w, pumped 12 bbl. of 31.6°-gravity oil per day from sand at 2,438-48 ft., TD 2,448 ft.

Pontotoc County: Delaney 1 Harris, SW SW NE 23-5n-8e, pumped 8 bbl. of 32°-gravity oil per day from sand at 2,604-22 ft., TD 2,638 ft.

OKLAHOMA WILDCAT FAILURES

Carter County: Porter 1 Fogle, NW NW SW 27-2s-2w, dry, TD 3,505 ft., Hoxbar 1,980 ft.

Cotton County: Harper 2 Grimes, SE NW NE 21-1s-10w, dry, TD 2,504 ft., no tops reported.

Daves 1 Park, NE SE NE 23-4s-11w, dry, TD 1,350 ft., no tops reported.

Miller 1 Griffith, NE NE NE 14-4s-12w, dry, TD 1,576 ft., sand 1,400-05 ft., 1,450-55 ft., 1,480-87 ft. and 1,491-97 ft., no shows.

Garvin County: William Shaffer 1 Blanton, NW NW SE 2-3n-2e, dry, TD 3,010 ft., sand 2,571-85 ft. and 2,642-50 ft., Basal Pennsylvanian and Viola 2,736 ft., Bromide 2,787 ft., sand 2,920-32 ft. and 2,966-83 ft.

Grady County: Halliburton 1 Goodwin, SE SE NW 8-5n-8w, dry, TD 3,314 ft., sand 3,194-3,218 ft.

Greer County: Rogers 1 Grauman, NW NW NE 11-5n-21w, dry, TD 996 ft., granite 995 ft.

Hughes County: Helmerich 1 Madlock, SW SW SE 1-7n-9e, dry, TD 5,200 ft., Gilcrease 3,205 ft., Lower Gilcrease 3,468 ft., Wapanucka 3,676 ft., Cromwell 3,974 ft., Hunton 3,776 ft., Sylvan 4,868 ft., Viola 4,956 ft., Wilcox 5,058 ft., second Wilcox 5,081 ft.

Jackson 1 Tebe, SW SW NE 36-8n-10e, dry, TD 2,942 ft., no tops reported.

Kiowa County: Warlick 1 Hancock, NE NE SW 27-6n-15w, dry, TD 495 ft., no tops reported.

Whitehead 1 Sills, NW NW NW 6-6n-16w, dry, TD 477 ft., limy sand 390-400 ft. with slight show of oil.

Lincoln County: Biggs 1 Heinzig, SW SW NE 35-13n-6e, dry, TD 4,427 ft., Oswego 2,950 ft., Prue 2,960 ft., sand 3,072 ft. and 3,146 ft., Earlsboro 3,343-3,412 ft., broken sand 3,614 ft., Dutcher 3,700-55 ft., Hunton 4,162 ft., Sylvan 4,245 ft., Viola 4,326 ft., Wilcox 4,406 ft.

Logan County: Carlock 1 Post, NE NE NE 26-19n-4w, dry, TD 4,928 ft.

Love County: Burned Rock 2 Draughon, SE SE SE 21-6s-2e, dry, TD 731 ft.

Okfuskee County: Summit 1 Scott, SW SW SW 8-10n-10e, dry, TD 3,285 ft., Prue 1,410-31 ft., Skinner 1,552-1,600 ft., brown lime 2,447-55 ft., Upper Booch 2,551-64 ft., lower Booch 2,620-50 ft., Gilcrease 3,022-40 ft., Wapanucka 3,239-51 ft., Cromwell 3,251-85 ft.

Oklahoma County: Texas 1 Barker Mace Unit, C SW NW 21-13n-2w, dry, TD 6,265 ft.

Osage County: Peters 2 Osage, SW SW NE 7-22n-8e, dry, TD 3,016 ft., Arbuckle 3,002 ft.

Seminole County: Graham 1 Haley, NE SW

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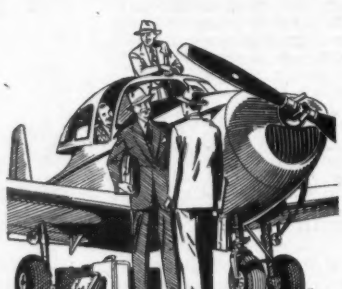

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NEW *Navion* By RYAN

RYAN AERONAUTICAL COMPANY, 1802 LINDBERGH FIELD, SAN DIEGO 12, CALIF.

SW 16-6n-7e, TD 1,437 ft., Calvin 1,427 ft. with a show of oil.

Stephens County: Stewar 1 Yeager-Cohn, SW SW SW 21-1s-8w, dry, TD 2,752 ft., no tops reported.

Tillman County: Spears 1 Coon-Ah-Vich-Nah, SW NW NW 34-4s-15w, dry, TD 4,113 ft., Megargel 2,190 ft., Gunsite 2,404 ft., Caney 2,898 ft.

PERMIAN BASIN

Humble Logs 194 Ft. Of Pay, Drilling Ahead

MIDLAND.—In southwest Ector County, Humble Oil & Refining Co. was drilling ahead to determine water table after logging 194 ft. of pay in its 2 Yarbrough & Allen, southwest offset to the pool discovery. A drill-stem test from 10,627-664 ft. flowed slightly more than 27 bbl. of 43°-gravity oil in 2 hours. The test was open 4 hours and a 1,000-ft. water cushion was used. Gas came to the surface in 73 minutes, water cushion in 158 minutes and oil at the end of 164 minutes. The oil flow decreased from 18 bbl. the first hour to 9½ bbl. the second hour. Gas-oil ratio was 1,200 cu. ft. The well is said to be running approximately flat with the discovery, having topped the Ellenburger at 10,470 ft.

The same company's 3 Yarbrough & Allen, Section 18, Block B-14, ½ mile to the south, was drilling below 8,799 ft. Humble's 4 Yarbrough & Allen, wildcat test 3½ miles southwest of the field, was straightening the hole, with total depth at 7,668 ft., in lime and shale.

The Texas Co. 1 McKnight, northwest offset to the company's 31 Connell, discovery well of the Jordan Connell field, in northwestern Crane County, recovered oil on a drill-stem test of the Clear Fork at 4,640-75 ft. Gas came to the surface in 6 minutes, and in 90 minutes total recovery was 1,530 ft. of free oil, and 90 ft. of oil and gas-cut mud. The well is said to be running slightly higher than the 31 Connell.

First reports for the week totaled 56, divided among the following counties: Andrews 8, Cochran 2, Coke 1, Crane 3, Crockett 4, Dawson 1, Ector 8, Gaines 1, Glasscock 1, Hale 1, Hockley 7, Howard 1, Mitchell 2, Pecos 6, Reagan 2, Reeves 1, Scurry 2, Upton 1, Ward 1, and Winkler 3. Total included 8 wildcats. Pecos and Regan counties had 2 each, while Andrews, Cochran, Crockett and Ector counties had 1 wildcat each.

Week's completions totaled 57, including 50 oil wells and 7 dry. Sun Oil Co. finished its 1 Arledge, Marble Falls limestone discovery 4½ miles northwest of Sanco in Coke County, for 176 bbl. of oil a day. Five dry wildcats were in Gaines, Mitchell, Terry, Winkler and Yoakum counties.

WEST TEXAS SUCCESSFUL WILDCAT (DISTRICTS 7-C & 8)

Coke County Sun Oil Co. 1 J. W. Arledge, 1,980 ft. from south and west lines, Sec. 261, Blk. 1-A, H&TC Sur., 4½ mi. NW Sanco, flowed 176 bbl. 47.8°-gravity oil a day, ¼-in. choke on 2-in. at 6,616 ft., tubing pressure 390 psi., casing pressure 965 psi., GOR 1,395 cu. ft., Marble Falls 6,598-6,617 ft., TD 6,820 ft.

WEST TEXAS WILDCAT FAILURES (DISTRICTS 7-C & 8)

Mitchell County: H. S. Moss 1 P. K. Mackey, Sec. 11, Blk. 29, T&P Sur., 6 mi. N Iatan, dry, TD 3,100 ft., show gas 2,990 ft., top limestone 1,830 ft.

Terry County: Honolulu Oil Corp. 1 Irma Lewis, Sec. 18, Blk. C-36, PSL Sur., 5 mi. N Adair, dry, TD 5,432 ft., anhydrite 2,370 ft., Brown limestone 4,310 ft., San Andres 4,810 ft.

Winkler County: Magnolia Petroleum Co. 1 R. A. Wheeler, Sec. 13, Blk. 40, PSL Sur., 5 mi. W Wheeler field, dry, TD 11,652 ft., anhydrite 1,240 ft., Yates 2,690 ft., Glorietta 5,400 ft., Clear Fork 5,790 ft., Pennsylvanian 8,080 ft., Mississippi 8,250 ft., Woodford shale 8,850 ft., Devonian 9,340 ft., Silurian 9,540 ft., Ellenburger 11,570 ft., elev. 3,009 ft.

Yoakum County: F. T. Brahaney 1 Sherman Henard, Sec. 394, Blk. D., J. H. Gibson Sur., 3 mi. W Plains, dry, TD 5,326 ft., anhydrite 2,300 ft., Brown limestone 4,080 ft., San Andres 4,530 ft., elev. 3,687 ft.

(Week Ended January 24)

Glasscock County: A. J. Slagter, Jr. 1 W. L. Foster, Sec. 40, Blk. 30, W&NW Sur., 3 mi. W Konahassett, dry, TD 3,595 ft., San Andres 2,208 ft., Clear Fork 3,225 ft., elev. 2,665 ft.

Schleicher County: George D. Morgan 1 McBurnett, Sec. 27, Blk. 1, GH&SA Sur., 3¼ mi. SE Page field, dry, TD 5,800 ft., no tops reported.

Skelly Oil Co. 1 J. T. Jackson, Sec. 43, Blk. LL, Salley Renshaw Sur. 78½, 1½ mi. NW Eldorado, dry, TD 7,533 ft., Pennsylvanian 3,620 ft., Canyon 5,095 ft., Palo Pinto 6,488 ft., Strawn 6,984 ft., Ellenburger 7,165 ft., elev. 2,455 ft.

SOUTHEASTERN NEW MEXICO

HOBBS.—Production from the McKee sand of the Simpson was indicated at Gulf Oil Corp. 6 C. E. LaMunyon, NE NE 28-23s-37e, approximately 10½ miles south of Eunice in Lea County. A 2-hour drill-stem test at 9,348-81 ft. had gas at the surface in 35 minutes, followed by the 1,500-ft. water blanket, and flowing oil at the end of 75 minutes. It was allowed to flow into pits for 15 minutes and then turned into tanks, gaging 42 bbl. of oil the last 30 minutes. There was no water. Gas was estimated at 25,000 cu. ft. daily at the beginning of the test, increasing to an estimated 828,000 cu. ft.

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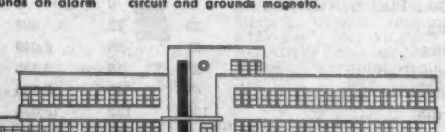

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Completions Up 10 Per Cent Compared With Last Year

THE number of wells completed in December totaled 2,627, a gain of 229 wells or about 10 per cent over December 1946. This gain was made up from 168 oil wells, 3 gas wells, and 58 dry holes. The increase in the number of oil wells represented a gain of 13 per cent compared with 6 per cent more dry holes. This comparison indicates that the results from December's drilling were better than the 10 per cent gain in total wells.

Total footage of almost 9.2 million feet was up 14 per cent or 1.1 million feet from the total for December 1946. The average well depth was 3,490 ft. compared with 3,364 ft. for the corresponding month of the previous year. This increase in average depth, a continuation of a general trend that has existed for several years, is also shown by the 14 per cent footage gain from the drilling of 10 per cent more wells. A large part of the depth increase is accounted for by deeper drilling in the Oklahoma-Kansas area where the average well deepened from 2,997 ft. in December 1946 to 3,300 ft. in December 1947.

Deeper Drilling Indicated

The major increases for the month were recorded in depth classifications above 2,500 ft., but all classifications show increases except in the 1,000-2,500-ft. range. The greatest number of wells and the largest gain in any single classification fell in the 2,500-5,000-ft. group where the total of 1,095 wells represented a numerical increase of 165 or 19 per cent. The Texas-New Mexico area reported gains of 138 wells in this classification to account for the greater part of the total increase.

The 64 more wells in the 5,000-10,000-ft. range represented a net gain of 16 per cent for the group, while the 10 additional deep completions, wells over 10,000 ft., gave this classification an increase of 19 per cent over last year. The shallow wells under 1,000 ft. also increased to 115 compared with 92 a year ago.

Sectional Comparison With 1946

Increases in total completions were recorded for all sections of the country except the north central and eastern areas. The Texas-New Mexico area had the largest numerical gain, 175 wells or 28 per cent. Gains of 57 wells in the southern area, Arkansas-Louisiana-Mississippi-Georgia and Florida, represented a percentage increase of 35. The Oklahoma-Kansas region reported 53 more wells than last year, a gain of 11 per cent. The 89 per cent increase in the Rocky Mountain area, Montana-Colorado and Wyoming, was the result of 39 additional wells. California's total was 9 wells above last year for a gain of 6 per cent. The eastern section, including New York, Pennsylvania, and West Virginia, recorded 61 fewer completions than in the previous December and the north-central area, Ohio-Indiana-Kentucky and Michigan, fell 43 wells short of completions in December 1946.

A breakdown of the total December completions places 14.2 per cent of the wells drilled in the eastern states, 16.7 per cent in the north-central area, 21.5 per cent in Kansas-Oklahoma, 30.7 per cent in Texas-New Mexico, 7.7 per cent in the southern area, 3.2 per cent in the Rocky Mountain states, and 6.0 per cent in California.

Out of the 1,416 oil-well completions, 500 were in the Texas-New Mexico area, 268 in Oklahoma-Kansas, 165 in the eastern states, 162 in the north-central area, 136 in the southern area, 132 in California, and 53 in the Rocky Mountain states.

Comparison With November 1947

The 12 per cent drop in December total completions compared with the November total is accounted for by the general seasonal trend toward fewer wells in the winter months. In a typical year, the seasonal trend, combined with the normal annual increase, will show about 20 per cent of the year's wells in the first quarter, slightly over 25 per cent in the second quarter, almost 30 per cent in the third quarter, and a little less than 25 per cent in the fourth. On this basis, the December wells should represent about 7 or 8 per cent of the year's total. Individual months may vary widely from this curve because of conditions affecting drilling materials, crude demand, and other factors. However, a comparison of the completions in December with total wells for the year indicates that the December position in the near record-setting year was normal.

Total completions were 12 per cent below November, but the number of oil wells fell only 8 per cent below, compared with 17 per cent fewer dry holes. The 9 per cent decline in footage compared with the 12 per cent drop in total wells drilled shows a continuation of the increasing depth trend even on a monthly basis. The average depth for December was 45 ft. above that for November.

SUMMARY OF COMPLETIONS, DECEMBER 1947

	Comp.	Oil	Prod.	Gas	Dry	Under 1,000 ft.	1,000-2,500 ft.	2,500-5,000 ft.	5,000-10,000 ft.	Over 10,000 ft.	Total footage	Rigs and drilling
New York	78	39	82	0	[1]39	0	78	0	0	0	113,104	162
Pennsylvania	229	115	257	22	[2]92	0	205	24	0	0	385,006	258
West Virginia	65	11	148	39	15	0	33	26	6	0	172,901	237
Ohio	108	18	461	39	51	11	31	64	2	0	322,990	207
Indiana	71	35	3,122	1	35	17	41	13	0	0	135,754	105
Kentucky	67	31	2,091	4	32	17	34	16	0	0	129,143	84
Illinois	142	63	7,375	1	78	6	52	84	0	0	362,885	214
Michigan	52	15	8,380	4	[3]33	0	28	24	0	0	124,089	113
Kansas	241	105	38,429	43	[3]93	0	24	214	3	0	772,704	373
Neb., Mo., Iowa	2	0	0	0	2	2	0	0	0	0	1,116	11
Oklahoma	303	[5]163	17,484	12	[5]128	7	106	132	52	6	1,028,225	675
Texas	746	452	91.199	50	244	46	103	333	244	20	3,274,281	1,042
North	131	63	5,534	1	67	12	43	62	14	0	361,237	186
West Central	63	[5]24	2,034	4	35	0	14	35	5	0	207,591	77
West	186	151	60,620	1	34	13	15	93	57	8	918,518	169
Panhandle	54	37	3,393	13	4	0	1	49	4	0	187,451	124
Eastern	74	[4]44	4,821	7	23	0	4	45	25	0	293,249	74
Gulf Coast	116	[6]68	8,793	18	30	0	3	28	76	9	736,403	215
Southwest	122	[5]65	6,004	6	51	12	23	21	63	3	569,831	197
Louisiana	151	100	12,260	12	39	0	69	34	27	21	670,374	226
Northern	102	65	5,135	10	27	0	66	30	5	1	247,617	92
Southern	49	[6]35	7,125	2	12	0	3	4	22	20	422,757	134
Arkansas	24	13	1,222	0	11	0	2	16	6	0	105,725	43
Mississippi	40	[7]23	7,070	6	11	0	1	1	23	15	329,441	57
Ala., Ga., Fla.	5	0	0	0	[8]5	0	2	1	2	0	20,780	7
Montana	28	12	394	9	7	3	17	7	1	0	60,090	58
Wyoming	32	25	6,649	0	7	2	4	20	6	0	111,789	103
Colorado-Utah	23	16	3,133	0	7	1	1	2	19	0	131,612	75
New Mexico	62	[4]48	9,555	6	8	2	9	25	26	0	273,759	126
California	158	132	15,054	1	25	1	55	59	41	2	642,642	346
Total December, 1947	2,627	1,416	224,365	249	962	115	895	1,095	458	64	9,168,500	4,522
Total November, 1947	2,991	1,554	245,989	283	1,154	183	829	1,396	490	93	10,303,533	4,516
Total December, 1946	2,398	1,248	206,357	246	904	92	928	930	394	54	8,066,213	3,840

Service wells included: [1]39, [2]86, [3]6, [4]1. Distillate wells included: [5]1, [6]2, [7]3.

LA.-ARK.

Hunt Finds Production In Catahoula Wildcat

SHREVEPORT.—Hunt Oil Co. apparently found flush production at its 1 Louisiana Delta Lumber Co. wildcat in 6-4n-5e, Catahoula Parish, in an unidentified section between 5,506-12 ft., after drilling to total depth of 10,442 ft. in the Lower Cretaceous. Flowing through 15/64-in. tubing choke, on a flowing pressure of 600 psi., it was estimated to have put some 170 bbl. of oil into pits. It then flowed 250 bbl. of oil, under tubing pressure of 1,000 psi., and was shut in for additional storage. Gas-oil ratio was 2,500 cu. ft.

In Bienville Parish, 2 miles northeast of Bear Creek field, C. H. Murphy et al 1 George Pipes, 19-17n-5w, increased its flow of gas from 15,000,000 cu. ft. to an estimated 90-100,000,000 cu. ft. daily, through ⅛-in. choke. Operators shut it in for an official gage.

The 1 Pipes was drilled to 8,324 ft., in the Travis Peak. Casing was set to 7,728 ft. and the estimated flow was made through perforations between 7,647-82 ft., with packer at 7,591 ft. Flowing tubing pressure was 3,050 psi.

In Union County, Arkansas, G. H. Vaughn 1 Annie Smith swabbed 55 bbl. of oil in 4 hours and was waiting on standard rig for completion tests. On an elevation of 169 ft., the well had top of Smackover limestone at 6,310 ft., and top of porosity at 6,331 ft. Perforations were between 6,337-42 ft. Location is west of production in the Smackover field.

ARKANSAS WILDCAT FAILURE

Lafayette County: L. M. Crow 1 Bodcaw, NE SW 19-15s-22w, dry, TD 4,008 ft., Midway 1,206 ft., Arkadelphia 1,904 ft., Nacatoch 2,014 ft., fault 2,152 ft., Tokio 2,346 ft., Tuscaloosa 2,552 ft., Paluxy 2,620 ft., Glen Rose 2,800 ft., Massive anhydrite 2,980-3,015 ft., Kilpatrick 3,015 ft., Hill 3,217 ft., James 3,545 ft., Pettit 3,745 ft., porosity 3,795-3,806 ft., Travis Peak 3,890 ft., elev. 315 ft.

(Week Ended January 24)

Phillips County: McAlester Fuel Co. 1 E. W. Welsh, SW SW SW 24-4s-2e, dry, TD 4,939 ft., formation tops not reported.

CANADIAN FIELDS

Good Recovery Indicated In Test Near Leduc Field

CHATHAM.—Testing a potential new producing area 3½ miles northwest of the nearest Leduc production, Imperial-Woodbend 1, LSD 5, 15-51-26w4, halted drilling after establishing the oil-water level at 5,340 ft. Plug was set at bottom to set off the water and casing run to 5,325 ft. Four successive drill-stem tests between 5,294 and 5,330 ft. showed gas flows similar to those in the Leduc field with oil rising to the surface in 20 to 25 minutes. Definite production tests are in progress, with a good oil recovery indicated. Imperial will move the outfit for a second test.

Leduc.—Continental Leduc 1, LSD 2, 9-50-26w4, finished at 5,410 ft., made a drill-stem test of D-3 zone. Oil rose to the surface in 13 minutes, clean oil flowing 5 minues before being shut in. The well, now being placed in steady production with indications of a major producer, extends the field ¼ mile to the south. Globe-Leduc West 4, LSD 15, 34-50-26w4, at 5,286 ft. was swabbed into production, and on 2½ hours' flow test produced 562 bbl. Location is near the northern end of the field. East Leduc-South Brazeau 3, LSD 7, 9-50-26w4, finished at 5,409 ft., in drill-stem test surfaced oil from the D-3 zone in 23 minutes, and is being placed on restricted production. East Leduc 2, LSD 10, 5-51-25w4, a wildcat test 2½ miles northeast of production, got the D-2 zone at 4,865 ft. and is deepening to test D-3.

Atlantic Oils 1, LSD 13, 23-50-26w4, finished at 5,337 ft., is making 150 bbl. Atlantic 2, LSD 14, same section, at 5,349 ft. is making 160 to 175 bbl. Both are on restricted production.

At a recent Alberta government auction of Leduc acreage, Renzo Falco of New York bid 48½ per cent royalty plus the regular 12½ per cent on one LSD and Saskatchewan Federated Co-Operatives bid 50 per cent over the regular royalty on another LSD. The bids, on proven offset acreage, represent a record for Alberta.

Turner Valley.—In North Turner Valley, Home-Millarville 30, LSD 7, 33-20-3w5, finished in Madison limestone, at 8,411 ft., the lower porous yielding 4 bbl. an hour, increasing to 20 bbl. after first acid wash. Acidizing and testing is being continued.

Pincher Creek.—In the Pincher Creek area, in southern foothills close to the Montana boundary, Gulf Canadian 1, LSD 15, 24-3-29w4, is recementing behind casing before making further tests. The well bottoms at 11,927 ft., and drill-stem test in Madison limestone at 11,800 ft. showed 10,000,000 cu. ft. of wet gas with 5,775 psi. pressure.

Westlock.—In the Westlock area, north of Edmonton, Westlock Petroleums 1, LSD 14, 14-59-26w4, is deepening to rig capacity of 4,600 ft. and is expected to enter the D-3 zone. The hole will be acidized and tested at 3,850 ft. where cores showed oil similar to that in the Leduc field.

Socony-Vacuum 1 Stimson Creek, LSD 12, 5-15-2w5, got the Madison limestone high at 3,502 ft. and is deepening to the potential producing horizon.

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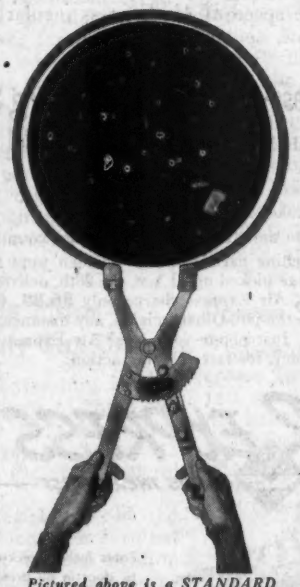

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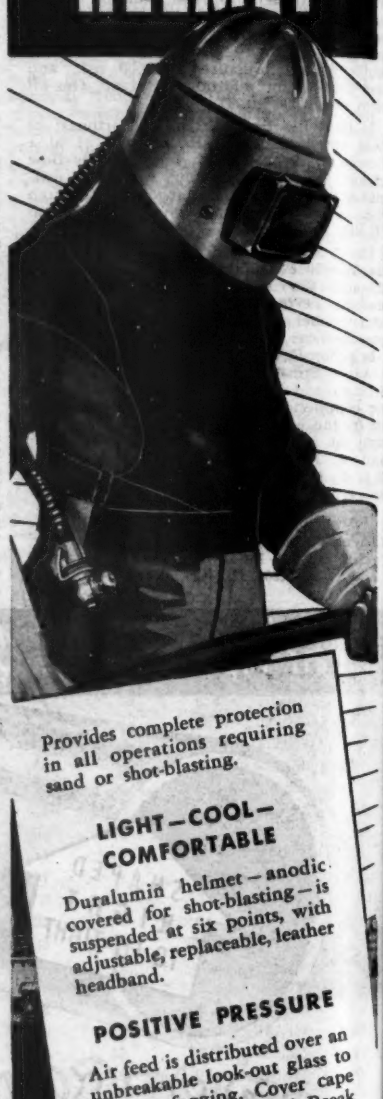

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Coal Gasification Urged by Keith

(Continued from page 39)

Keith said Stanolind's total investment of $70,000,000 includes chemical plants in both areas, gas production, employe housing, and auxiliary facilities. The Hugoton plant itself is estimated to cost about $32,000,000 against $21,000,000 at Brownsville. The difference, he said, is due to the air-reduction problem at the increased altitude, the nitrogen content of the air, scarcity of water, and different specifications.

Keith also mentioned that engineering work is in progress on a coal-to-liquid fuels plant for Anglo-Transvaal, a mining company, to be built near Johannesburg. This plant, to have an output of about 7,500 bbl. daily, probably will not be completed for about 3 years.

Engine Maintenance

Another discussion attracting considerable interest at the N.G.A.A. meeting was a paper on "Engine Maintenance" by Ralph Boyer, The Cooper-Bessemer Corp., Mount Vernon, Ohio, and given by Dennis Gallogly, also of Cooper-Bessemer.

Although it is costly to let engines run until failure, some operators in their preventive maintenance programs often reduce engine life by too frequent dismantling and inspection. A balance between the two extremes is most desirable, and a thorough daily log sheet of engine operation was suggested as the means toward an effective maintenance program. A study of operating records will often indicate what is taking place in an engine while dismantling can materially shorten the life of bearings and pistons.

On the subject of lubrication, Gallogly said tests show that it is not true that the use of lighter oils is to be preferred. No greater mechanical efficiency was shown on larger, slow-speed engines using lighter oils. Though some carbon formation is possible with heavier oils, often S.A.E. 40 or 50 will give better lubrication at lower cost.

Fractionating Columns

Normally, a fractionating column will operate quite smoothly and give no trouble but there are times when, for no apparent reason, a column will start giving trouble, the most common cause of which is often a sudden change in feed rates or feed composition.

These comments on fractionating were made in a paper at the N.G.A.A. meeting by A. J. L. Hutchinson, Fish Engineering Co., Houston, and given by Tom Tabbert, also of Fish Engineering. In operation of a fractionating column, a sudden change in feed rate can be checked by the instruments but a sudden change in feed composition often comes without warning or any method of checking.

Another occasional source of trouble is water entering the column with the feed. A normal column will take overhead the usual amount of water held in solution with the feed but if the water drawoff on the feed tank fails and a relatively large amount of water is introduced into the column, difficulty will be encountered, Tabbert said. This condition can be corrected by increasing the reflux rate and drawing off the water continuously from the reflux accumulator.

The regional N.G.A.A. meeting in the Gulf Coast area was the first of its kind since the war. Registered attendance was about 250. Others on the program:

C. R. Williams, vice president of The Chicago Corp., Corpus Christi, who described the new regional meetings as an improvement on the old plant operators' sessions and said the natural-gasoline business with its impressive record during the war has become one of the most important segments of the petroleum industry.

Roy Machen, Sulphuric Engineered, Inc., Bay City, formerly with Hammond Exploration Co., who reviewed some of the basic physical properties of hydrocarbons, appearing in place of Dr. Frank Dotterweich, Texas A. & I. College, Kingsville, who was ill.

R. C. Burrow, division manager, loss-prevention department, Liberty Mutual Insurance Co., Dallas, and chairman of the Southwest chapter, American Society of Safety Engineers, who discussed factors involved in a safety program, including management participation, foreman support, and effective instruction and training of employes.

H. F. Browne and E. J. Podgorski, U. S. Bureau of Mines, Dallas, who presented an interesting demonstration showing the conditions under which gasoline and other hydrocarbons are explosive, pointing out likely causes for accidents and fires.

Texas Tidelands Maps Ready for County Tax Use

AUSTIN.—Maps extending county boundaries to the edge of the Continental Shelf have been forwarded to the county judges of Texas' 12 coastal counties by the state general land office.

The last Texas legislature, in the face of litigation which later resulted in a Supreme Court decision holding the federal Government had paramount rights in California's offshore lands, passed a bill extending gulfward the state's boundaries to the 100-fathom line running from 50 to 150 miles off the coast *(The Oil and Gas Journal, January 1, 1948, page 22)*.

The maps will be used by the counties to determine their jurisdiction for tax purposes. In its last sale, the state school fund received more than $12,000,000 in bonus money on undeveloped submerged acreage leased for oil and gas development.

Republic Buys Upton County Spread

Republic Natural Gas Co. of Dallas has acquired a spread of 1,140 acres in the vicinity of the recent Upton County oil strike by Slick-Urschel-Plymouth Oil Co. The properties were acquired from Rose Halff Barnat of Brookline, Mass., for a reported sum of $500,000 cash and an override of one-sixteenth out of seven-eighths of all oil that may be produced.

Lion Oil Has New Film

Lion Oil Co., El Dorado, Ark., has produced a new 16-mm., 25-minute, color motion picture, "Revolution in the South," showing the company's operations from exploration through marketing and featuring its specialty and chemical products and the effects of petroleum on industrial development in the South. The film will be shown to Lion's employes and customers and is available for showings to schools and civic groups.

A.I.M.E. Section Will Hear Elkins, Jones

Lloyd Elkins, chief engineer for Stanolind Oil & Gas Co., and Dr. Daniel J. Jones, research geologist with Phillips Petroleum Co., will address the Mid-Continent section of the American Institute of Mining and Metallurgical Engineers in a meeting February 9 in Bartlesville, Okla.

Jones will discuss a continuous 400-ft. diamond core of the Ellenburger taken from Phillips' 7 Alma in TXL field. The core will be on display at the meeting.

Power Slips Are Split-Second

Speaking of "New Power Slips Increase Drilling Efficiency," the subject which was described in the Journal issue of January 22, page 72—the article timed this new product much too slow in an important operating respect. The air-pressure actuation will cause the slips to set in one second or less, rather than in "one minute or less," as stated.

Hickey Buys Martin Properties

J. M. Hickey, of Fort Worth, has acquired the entire fee and half of the mineral rights on 20,800 acres in Reeves County, Texas, from Edgar Martin, of Alpine, Tex., in a deal involving $245,250.

STATISTICS and T

WEEKLY WELL COMPLETIONS . . . WEEK ENDED JANUARY 31, 1948

	Total of all wells					Cum.		Wildcat completions and discoveries					Cumulative total, 1948				
	Comp.	Oil	Gas	Dry	Footage	1948	1947	Oil	Dist.	Gas	Dry	Total	Oil	Dist.	Gas	Dry	Total
New York	31	15	0	*16	29,132	174	139	0	0	0	0	0	0	0	0	0	0
Pennsylvania	60	29	1	†30	104,347	321	311	0	0	0	1	1	0	0	0	5	5
West Virginia	24	2	19	3	54,017	74	71	0	0	3	2	5	0	0	7	9	16
Ohio	21	9	6	‡6	62,783	108	130	0	0	0	2	2	1	0	2	4	7
Indiana	16	12	0	4	28,119	79	40	0	0	0	0	0	0	0	0	0	0
Kentucky	14	5	3	6	26,040	62	38	0	0	0	0	0	0	0	0	1	1
Illinois	28	16	0	12	76,463	202	187	0	0	0	4	4	3	0	0	30	33
Michigan	9	3	1	5	20,151	78	81	0	0	0	3	3	2	0	3	27	32
Kansas	68	35	6	27	229,297	273	244	1	0	0	10	11	4	0	0	31	35
Neb., Mo., Iowa	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Oklahoma	92	47	8	37	282,158	363	365	2	0	0	20	22	14	0	3	68	85
Texas	194	108	8	78	864,454	985	671	4	0	2	41	47	27	0	6	212	245
N. Central (Dist. 7-B & 9	55	20	0	35	158,237	295	212	1	0	0	13	14	15	0	0	78	93
West (Dist. 7-C & 8)	57	50	0	7	265,000	258	171	1	0	0	5	6	3	0	0	18	21
Panhandle (Dist. 10)	7	4	3	0	22,114	59	38	0	0	0	0	0	0	0	0	0	0
Eastern (Dist. 5 & 6)	12	4	2	6	71,337	58	41	0	0	0	5	5	3	0	0	19	22
Gulf Coast (Dist. 2 & 3)	35	17	1	17	235,794	162	156	1	0	1	12	14	4	0	3	50	57
Southwest (Dist. 1 & 4)	28	13	2	13	111,972	153	53	1	0	1	6	8	2	0	3	47	52
Louisiana	26	18	2	6	77,301	173	105	1	0	0	0	1	2	1	0	14	17
Northern	21	14	2	5	48,767	121	50	0	0	0	0	0	0	0	0	9	9
Southern	5	4	0	1	28,534	52	55	1	0	0	0	1	2	1	0	5	8
Arkansas	6	1	0	5	15,198	40	20	0	0	0	2	2	1	0	0	11	12
Mississippi	3	2	0	1	26,486	39	35	0	0	0	1	1	2	0	0	8	10
Southeastern States	1	0	0	1	2,800	5	5	0	0	0	1	1	0	0	0	4	4
Montana	2	1	0	1	6,992	27	16	0	0	0	1	1	1	0	0	5	6
Wyoming	8	5	1	2	33,395	42	22	0	0	0	2	2	3	0	0	3	6
Colorado-Utah	5	4	0	1	27,254	29	16	0	0	0	1	1	0	0	0	2	2
New Mexico	9	8	0	1	50,945	66	45	0	0	0	1	1	1	0	0	2	3
California	57	48	1	8	177,154	241	181	0	0	0	8	8	1	0	0	27	28
Total United States	674	368	56	250	2,194,486	3,381	2,722	8	0	5	100	113	62	1	21	463	547
Total previous week	673	386	48	239	2,414,429	2,707	2,222	13	0	4	90	107	54	1	16	363	434
Total February 1, 1947	500	270	64	166	1,726,797	....	....	15	3	3	47	68	52	3	11	340	406

Service wells included: *16, †29, ‡1.

CRUDE PRICES AND REFINERY ACTIVITY

GRAVITY SCHEDULES

Top prices include all gravities above grades designated, and low prices include all gravities below grades designated:

Gravity—	Signal Hill, Calif.	Oklahoma, Kansas	Gulf Coast Tex.†	West Tex.‡
18-18.9	$2.17	....	....	....
19-19.9	2.19	....	....	....
20-20.9	2.21	$2.25	....	$2.12
21-21.9	2.23	2.27	....	2.14
22-22.9	2.27	2.29	....	2.16
23-23.9	2.30	2.31	....	2.18
24-24.9	2.34	2.33	$2.56	2.20
25-25.9	2.38	2.35	2.58	2.22
26-26.9	2.41	2.37	2.60	2.24
27-27.9	2.45	2.39	2.62	2.26
28-28.9	2.49	2.41	2.64	2.28
29-29.9	2.52	2.43	2.66	2.30
30-30.9	2.56	2.45	2.68	2.32
31-31.9	2.59	2.47	2.70	2.34
32-32.9	2.62	2.49	2.72	2.36
33-33.9	....	2.51	2.74	2.38
34-34.9	....	2.53	2.76	2.40
35-35.9	....	2.55	2.78	2.42
36-36.9	....	2.57	2.80	2.44
37-37.9	....	2.59	2.82	2.46
38-38.9	....	2.61	2.84	2.48
39-39.9	....	2.63	2.86	2.50
40 and above	....	2.65	2.88	2.52

†For crude from Daboval, El Campo, and Sand Point. ‡Includes Lea County, New Mexico.

A.P.I. REFINERY REPORT, WEEK ENDED JANUARY 24

(Thousands of barrels)

District—	Crude runs, daily avg.	Production: Gasoline†	Kerosine	Gas & dist. oil	Residual	Stocks at refineries, bulk terminals, in transit and in pipe lines: Gasoline*	Kerosine	Gas & dist. oil	Residual
East Coast	775	1,903	350	1,583	1,639	20,457	4,771	10,497	7,150
Appalachian:									
District 1	102	295	67	82	97	2,278	264	531	411
District 2	72	210	34	71	110	1,115	129	295	162
Ind., Ill., Ky.	876	2,848	458	1,004	1,161	19,114	2,068	5,884	4,621
Okla., Kans., Mo.	459	1,633	196	578	492	9,135	710	2,558	1,553
Inland Texas	260	1,107	122	171	443	3,621	459	431	781
Texas Gulf Coast	1,381	4,183	630	2,180	1,792	18,562	1,436	6,056	6,914
La. Gulf Coast	402	1,192	379	704	520	5,388	876	1,864	1,551
N. La. & Ark.	80	212	57	87	132	1,576	248	582	153
Rocky Mountain:									
New Mexico	11	33	4	10	26	88	25	21	31
Other Rocky Mtn.	154	479	31	186	285	2,425	130	703	618
California	874	2,652	75	1,062	2,485	16,827	881	12,980	27,149
January 24, 1948	5,446	16,747	2,403	7,718	9,182	100,586	11,997	42,402	51,094
January 17, 1948	5,344	16,236	2,489	7,496	8,880	98,751	12,975	44,482	51,601
January 25, 1947	4,760	14,422	2,231	5,414	8,260	98,030	14,528	50,670	47,805

*Finished and unfinished. †At refineries including natural blended.

Bureau of Mines crude-oil stocks 221,915,000 bbl. as of January 24—down 26,000 bbl. One year ago 221,655,000 bbl.

FLAT CRUDE PRICES

Representative posted schedules per bbl.

East Texas	$2.65
Kettleman Hills, California*	2.14
Beauregard Parish	2.60
Illinois Basin	2.77
Pecos County, Texas (Yates)	1.85
Bradford, Pennsylvania	5.00
Eastern Ill. and Western Ind.†	2.77
Tomball, Texas Gulf Coast	2.83

*37°-37.9°. †35° and above.

TRENDS

DAILY AVERAGE PRODUCTION FOR WEEK

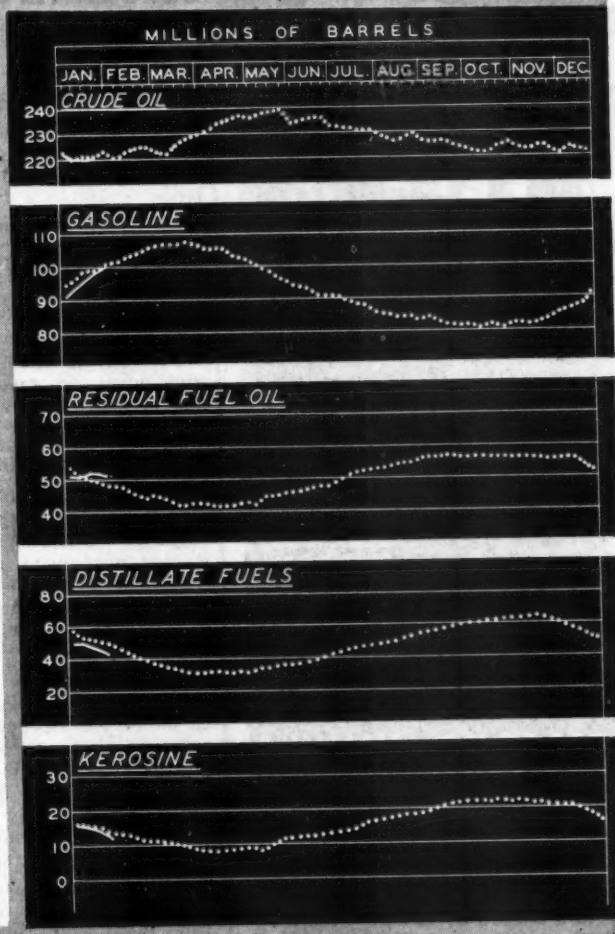
	Jan. 31 crude oil	B. of M. Jan. demand	Jan. 24 crude oil
Alabama	1,250	1,500	1,300
Arkansas	87,750	82,000	87,000
California	934,200	930,000	934,900
Colorado	46,100	47,000	46,660
Eastern	60,520	64,900	61,980
Florida	800	1,000	825
Illinois	168,900	185,000	167,800
Indiana	18,800	16,000	16,900
Kansas	296,050	306,000	295,850
Kentucky	25,600	26,000	25,900
Louisiana	472,550	453,000	472,750
North Louisiana	118,550	.....	118,750
South Louisiana	354,000	.....	354,000
Michigan	45,950	45,000	46,200
Mississippi	114,250	106,000	117,200
Montana	23,960	24,000	23,730
Nebraska	500	600	500
New Mexico	123,100	125,000	123,100
Oklahoma	403,750	405,000	409,450
Texas	2,385,700	2,310,000	2,385,700
Dist. 1 (Southwest)	25,600	.....	25,600
Dist. 2 (Southwest)	168,350	.....	168,350
Dist. 4 (Southwest)	255,500	.....	255,500
Dist. 3 (Gulf Coast)	496,750	.....	496,750
Dist. 5 (Eastern)	44,125	.....	44,125
Dist. 6 (Eastern)	120,875	.....	120,875
East Texas field	294,500	.....	294,500
Dist. 7-C (West)	42,875	.....	42,875
Dist. 8 (West)	659,250	.....	659,250
Dist. 7-B (W. Central)	42,950	.....	42,950
Dist. 9 (N. Central)	142,725	.....	142,725
Dist. 10 (Panhandle)	92,200	.....	92,200
Wyoming	133,470	127,000	132,760
Total United States	*5,343,200	5,255,000	5,350,505
Change from prev.. wk.,	dn. 7,305		

Total production January 1-January 31 .. †166,791,415 bbl.
Same period last year (crude plus cond.) 144,620,340 bbl.

*Not incl. 47,730 bbl. condensate. †Incl. 1,479,630 bbl. condensate.

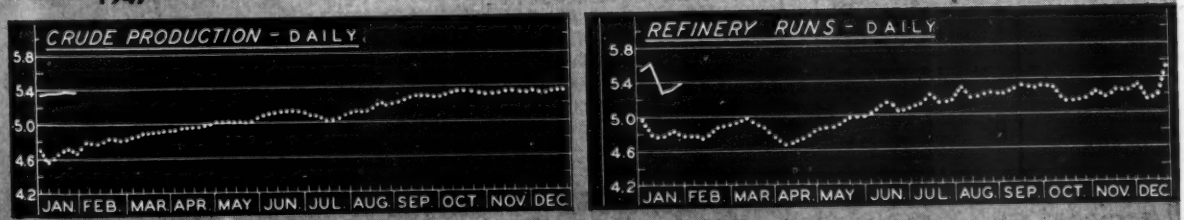
STOCKS IN UNITED STATES

---- 1947 ——— 1948



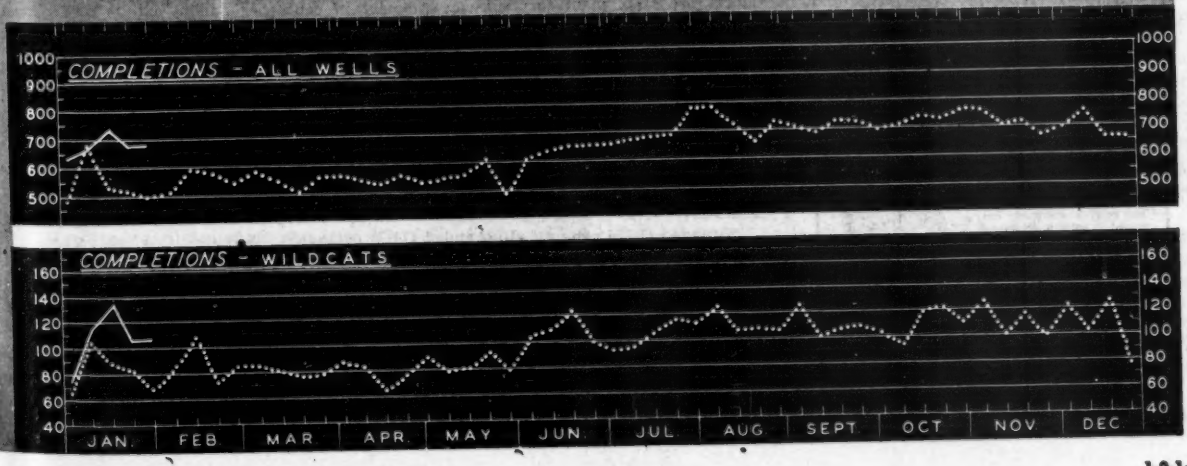
DAILY OPERATIONS

---- 1947 ——— 1948

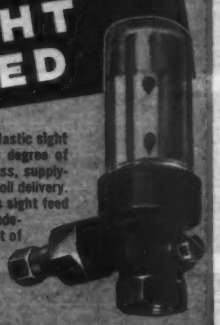


WEEKLY COMPLETIONS

---- 1947 ——— 1948



McCORD "CLEARSITE" SIGHT FEED



McCord "Clearsite" plastic sight feeds provide a new degree of visibility and clearness, supplying positive proof of oil delivery. Due to its design this sight feed may be used as an independent sight at point of lubrication. As an accessory it can be added to any lubrication system. Specify "Clearsite."

McCORD "SF" LIQUID SIGHT FEED LUBRICATORS

A highly developed lubricator, particularly adapted to cylinder and bearing lubrication. Features: Precision built, most flexible and positive oil delivery system known. Supplied in 1 to 24 feeds. Specify McCord "SF" Lubricator.

For Sale by National Supply Co.

McCORD CORPORATION DETROIT 11, MICHIGAN LUBRICATOR DIVISION

TACHOGRAPH

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OWNERS Say:—"They Make Runs More Profitable."

DRIVERS Say:—"They Give Me Confidence Every Inch of the Way."

MAINTENANCE MEN Say:—"They're Easy to Install."

They are all enthusiastic about Tachographs. They have found that through their use, payloads really pay, and efficiency, safety and economy result. The Tachograph gives a graphic record of the entire trip—When Engine Started . . . How Long Engine Idled . . . When Vehicle Started to Move . . . How Fast It Traveled . . . When Vehicle Stopped . . . Distance Traveled between Stops—all recorded on a paper chart.

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MARKETS

LAST week action was taken by the oil industry to help relieve the extremely tight situation of burning fuels. This situation was brought to a head by what has been called the nation's longest cold wave in 12 winters.

An emergency 2-month oil conservation program to bring immediate relief has been put into effect. The emergency program calls on oil companies to restrict consumers, wherever possible, to 2 weeks supplies on hand, increase fuel-oil output by cutting down on gasoline production, and to work 7 days a week loading and unloading tank cars.

East Coast Unchanged

Along the East Coast some sources said they were cutting into "reserve supplies." Quotations generally remained unchanged and all products continued tight. Fuel oil remained extremely tight and few offerings were reported available on the open market.

The National Petroleum Council has recommended that heating fuel oil output be stepped up at the expense of gasoline production. Gasoline has not been moving easily on the spot market at the present time and is predicted by some that the situation will be considerably worse by next spring and summer.

It has been necessary to curtail industrial users in such areas as Detroit, Pittsburgh, Buffalo and other areas in order to better insure delivery of fuel oil or gas to home consumers.

One gas company in Texas lifted its curtailment of natural gas to industrial users in 333 Texas and Oklahoma communities after the severe cold spell subsided.

In the Mid-Continent area burning oils remained tight. According to one shipper prices on light fuel oils which have had a tendency to go up in recent weeks are now beginning to show a leveling off. One observer said that he expected gasoline prices to go higher even before the normal pinch is expected.

One dealer said that he was offered a car of No. 2 burning oil at 12 cents if he would take a car of gasoline at 12½ cents while another buyer reported offerings of gasoline as high as 18 cents on the open spot market in buyers' cars.

One small shipment of No. 6 moved at $3.25 in the buyer's cars, and an offering of $3.50 was reported turned down in seller's cars. Several dealers reported that the tank car situation remained very tight but that those who had cars available could manage to find some products on the market.

In the Gulf Coast area while prices remained generally unchanged suppliers were swamped with requests for heating oils for movement north and east. Refiners reported drawing heavily on storage and maintaining maximum production in an effort to meet demand. The brisk off season activity in gasoline buying was interpreted by some marketing officials as indicating a shortage later this year.

Petroleos Mexicanos recently announced a change in its price quotations effective January 24 on Bunker C and diesel oil. Bunker C at Tampico, Veracruz, and Minatitlan is now $2.65 per barrel, and diesel fuel at Tampico and Minatitlan, $3.15 per barrel.

Representative Quotations

Representative spot-market quotations of leading suppliers as of February 2, 1948. Figures are f.o.b. plant for tank-car shipment in cents per gallon except for residual fuel oil which shows the price per barrel and wax, in cents per pound.

GASOLINE, KEROSINE, AND FUEL OILS

	Mid-Continent Group 3	New York Harbor	Texas Gulf Coast
Regular gasoline, 73-75 octane	10½-11½	11.6-12* 10.5-12.2†	10.9-13
Premium gasoline, 78-80 octane	11¾-12½	10.6-13.4	12.9-13½
42-44 w.w. kerosine	10-10½	9.8-10.8	10¼-12
No. 2 straw fuel oil	9½-11	8.9-9.9	9.05-11½
No. 6 residual	$2.50-2.90	$3.03-3.90	$2.56-3.50

*Branded (74-76 octane); †Unbranded (74-76 octane).

NATURAL GASOLINE

	Group 3	North Texas	N. La.
Grade 26-70	8½	8	8¼
Grade 18-55	10.2	9.6	9.9

LUBRICATING OILS

South Texas

300 vis., No. 2-3 neutral	13-14.5
750 vis., No. 3-4 neutral	15-17.25
2,000 No. 5-6 neutral	17-18½

LUBRICATING OILS

Mid-Continent

150-160 vis., D bright stock, 0-10 pp.	30-32
200 vis. No. 3 neutral, 0-10 pp.	20-21

Western Pennsylvania

145-155 vis. 10 p.t. br ght stock	47
180 vis. p.t. neutra	46

CRUDE-SCALE WAX

Mid-Continent

130-132 A.S.T.M. melting point	8½-9¼

EQUIPMENT MEN ... in the News

Kobe Announces Service Promotions

O. W. FLANDERS

Promotions have been announced by Kobe, Inc., of three of its key technical men to cope with the rapid increase in free pumping. O. W. Flanders, formerly California technical service manager, has been promoted to chief field engineer. He will head the company's field technical work in the general technical service division under W. F. Slater. Flanders installed the first hydraulic oil well pump in 1932 in a Baldwin Hills, Calif., well.

E. O. LAYMAN

J. J. PRICHARD

E. O. Layman, chief field engineer for the Mid-Continent technical service section, has been transferred to the West Coast as manager of California technical service. Layman has been a member of the Kobe organization since 1937. All but a year of that time has been spent in the Mid-Continent.

John J. Prichard, who since 1943 has served as manager of the Kobe West Texas and Oklahoma districts, has been promoted to division field engineer of the Mid-Continent technical service section. He is an experienced driller as well as production man. He joined the Kobe organization in September 1940 at Oklahoma City.

Hayes to New York

Ray Hayes, diesel sales engineer for Mid-Continent Supply Co., Fort Worth, is now working out of that company's export division in New York.

Hayes has been with Mid-Continent Supply Co. since 1937, representing the diesel department in Wichita and New Orleans. From there he went into the Army and served as a captain in the Air Corps. Coming back to the company after the war, he began work at the Fort Worth offices, then went to the Houston office for a while before returning to Fort Worth where he was promoted to sales engineer. He stayed there until his transfer to New York a few months ago.

White Moves to Houston

Richard (Dick) R. White, service engineer for Oil Base, Inc., Compton, Calif., manufacturers of Black Magic oil-base drilling fluids, has been transferred from the Los Angeles Basin area to the Houston area. He will headquarter at the Oil Base Houston office in the Southern Standards Building.

Salter Promoted

At the district sales managers meeting held at Houston recently, A-1 Bit & Tool Co. announced the appointment of T. Howard Salter as assistant sales manager. Salter served from 1918 to 1932 as roughneck and driller, and then entered the oil-field supply business with Houston Oil Field Material Co., as a salesman in the Louisiana district; from 1939 to 1945 he was district manager in Louisiana and Mississippi for Bethlehem Supply Co. After 2 years with Hunt Tool Co., he entered the employ of A-1 Bit & Tool Co. June 13, 1947.

Salter will have headquarters in Houston but will supervise sales in Louisiana and Mississippi.

Eastman Transfers Manor

Ralph L. Manor has recently been transferred from Odessa, Tex., to Bakersfield as sales representative for Eastman Oil Well Survey Co. Manor represented the Eastman organization in Cody, Wyo., previous to his sales work in Odessa, and prior to that was with Hughes Tool Co. for several years, as well as with the Magnolia Petroleum Co. in Louisiana.

National Supply Advances Lind

J. N. Lind has been promoted to assistant general traffic manager of National Supply Co. He will make his headquarters in the Grant Building, Pittsburgh. Lind started working with the company in 1926 as a clerk in the traffic department, Ambridge. He served in the capacity of assistant traffic manager of the Spang-Chalfant Division of National Supply Co. from 1937 until 1945 when he was promoted to traffic manager of the division.

A member of the Traffic Club of Pittsburgh for many years, Lind is now serving on the board of governors of the club.

Air Reduction Announces Sales Appointments

Air Reduction Sales Co. announces a series of promotions within the ranks of its technical sales personnel. Dr. G. V. Slottman, formerly manager, technical sales division, has been appointed technical assistant to the vice president. Scott D. Baumer, formerly assistant manager, technical sales division, was appointed manager of that division and Edward H. Roper was appointed assistant manager.

LeTourneau Creates Wire-Rope Department

R. G. LeTourneau, Inc., Peoria, Ill., has created a wire-rope sales department as part of the corporation sales division. With the advent of this new department LeTourneau will incorporate a full line of sizes, types, and construction of preformed and nonpreformed wire rope under its trade name of .Tournarope.

Direction of Tournarope sales will be under the supervision of W. H. Wilson, wire-rope sales manager. Assisting Wilson will be Michael R. Kahle and Alvin J. Becker, sales engineers. Kahle for 8 years was employed by Broderick & Bascom Rope Co., St. Louis, as district sales representative in that area. Becker joined services with LeTourneau in 1937 in the production department. From there he rose to supervisor of stock control, assistant production

manager, and production manager.

Veteran productioneer I. F. Eckland, for over 40 years associated with the wire-rope industry and the man who set up the original mill at the LeTourneau plant in 1941, will be in charge of Tournarope production.

Smith Heads Kankakee Works

L. B. SMITH

L. B. Smith, vice president and director of A. O. Smith Corp., Milwaukee, has been appointed general manager of the Kankakee Works of that company.

H. F. Detrick, who has held that post since the Kankakee Works went into production, has been carrying a dual responsibility. In addition to building the Kankakee organization from nothing up to a group in excess of 1,000 employes, he has at the same time continued to carry on his former duties as president of the Smith Meters Co. of Los Angeles, a wholly owned subsidiary of A. O. Smith Corp. Detrick will now devote his full-time energies to the further development of Smith Meter Co.

M. O. Johnston Promotes Deters

M. O. Johnston Oil Field Service Corp., Los Angeles, announces that Bruce Deters, formerly in charge of operations at Avenal, Calif., has been made service manager for California, New Mexico, and West Texas. In his new capacity Deters will have his headquarters at the corporation's head office and plant in Los Angeles.

Allis-Chalmers Elects Roberts and Johnson

Election of W. A. Roberts and W. C. Johnson, executive vice presidents of Allis-Chalmers Manufacturing Co., to the firm's board of directors is announced.

Roberts is executive vice president in charge of the company's tractor division while Johnson is executive vice president of the general machinery division.

The new directors succeed the late Dr. Charles E. Albright and Harold S. Falk, president of the Falk Corp., Milwaukee. Falk had submitted his resignation because of other business requirements.

Cox New Advertising Manager

W. K. Cox, assistant general sales manager, has been appointed advertising manager of Caterpillar Tractor

W. K. COX

J. J. VALENTINE

Co., Peoria, Ill. This appointment coincides with the announcement of the retirement of Gerald M. Walker, who has headed the department since 1931.

Succeeding Cox as assistant general sales manager is J. J. Valentine, central division sales manager, who has been associated with the company since 1929. Fred D. Haberkorn, sales training division manager and a member of the sales staff since he joined the company in 1935, succeeds Valentine. His post as sales training division manager goes to J. W. Mohler, currently serving as assistant central division sales manager. Mohler is replaced as assistant central division sales manager by Herman S. Eberling, currently a western division district representative, who has been connected with the sales department since 1933.

Hanford Heads Kellogg Research

As a focal step in streamlining the extensive technical and laboratory operations of M. W. Kellogg Co., process engineers, Dr. W. E. Hanford, scientist, has been appointed to the newly created post of director of petroleum and chemical research. Dr. Hanford joined the Kellogg organization in October 1946, going to that company from General Aniline & Film Corp., where he was director of research.

Greenewalt New Du Pont President

Crawford H. Greenewalt became the tenth president of E. I. du Pont de Nemours & Co., while Walter S. Carpenter, Jr., has been elected chairman of the board. Carpenter's resignation as president, and his designation as chairman of the board, followed the retirement of Lamont de Pont from the latter post. Greenewalt also became chairman of the executive committee, of which he had previously been vice chairman, and a member of the finance committee.

Du Pont will continue as a member of the board, while Carpenter retains his membership on the finance committee.

At the same time it was announced that Walter J. Beadle, a vice president and member of the board, had resigned as treasurer of the company and had been elected to membership on the executive committee. T. C. Davis, who had been first assistant treasurer, was elected treasurer to replace Beadle.

T.T.M.A. Elects Officers and Directors

At the recent national convention of the Truck-Trailer Manufacturing Association, Inc., held at Edgewater Park, Miss., the following officers and directors for 1948 were elected: president, Harrison Rogers, Rogers Bros. Corp., Albion, Pa.; western vice president, John C. Bennett, Utility Trailer Manufacturing Co., Los Angeles; eastern vice president, J. Cotrell Farrell, Eastern Car & Construction Co., Easton, Pa.; and treasurer, W. E. Grace, Hobbs Manufacturing Co., Fort Worth.

Directors elected included: L. C. Allman, Fruehauf Trailer Co., Detroit; Bert P. Bates, Highway Trailer Co., Edgerton, Wis.; Christopher Hammond, Jr., Steel Products Co., Inc., Savannah, Ga.; J. L. Glick, Truck Engineering Corp., Cleveland; L. A. Myers, Jr., Black Diamond Trailer Co., Inc., Bristol, Va.; C. A. Persinger, Wilson Trailer Co., Inc., Sioux City, Iowa; F. A. Schotters, Trailmobile Co., Cincinnati; R. C. Tway, Jr., Kentucky Manufacturing Co., Louisville; E. J. Ziegler, Keystone Trailer & Equipment, Kansas City.

Case Represents Cardwell

With appointment of Leo S. Case, Long Beach, as California sales representative, Cardwell Manufacturing Co., Inc., announces a change in method of representation in California for sales and service parts stocks.

Until recently the oil-field equipment manufacturing concern was represented in California through a dealership, but under the new program, the direct representative plan will be used.

Case's address is 3504 Atlantic Avenue, Long Beach; mailing address is P. O. Box 7006, Bixby Station. Besides Case's representation in the new Cardwell program, Apex Equipment Co. of Long Beach and Bakersfield will handle complete stocks of Cardwell parts. The Long Beach address is Apex Equipment Co., 3504 Atlantic Avenue. The Bakersfield address is Rosedale Highway, P. O. Box 1733.

(Continued on page 139)